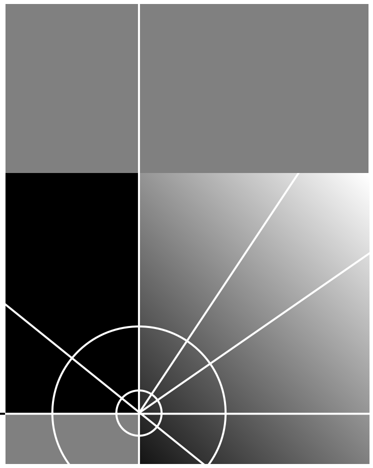
NETBuilder® Family Software Version 11.1 Release Notes

3Com provides a documentation CD-ROM that includes all NETBuilder® software version 11.1 manuals. To obtain a hardcopy version of the 11.1 documentation, order part number 3C6460P.

You can order the documentation CD-ROM using part number 3C6461P.

Additionally, all documentation for NETBuilder software version 11.1 is located on the 3Com website:

`http://infodeli.3com.com/infodeli/tools/bridrout/index.htm`



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NETBUILDER SOFTWARE VERSION 11.1 RELEASE NOTES

These release notes provide information on the following topics for NETBuilder® software version 11.1:

- Encryption Packages Notice
- Supported platforms
- New products
- Supported PC flash memory cards
- Approved DRAM SIMMs for the DPE Module
- New Features and application notes
- 11.1 Software Packages
- NETBuilder Upgrade Management Utilities
- Notes and cautions
- Known problems
- Limitations
- Changes and additions to the following guides:

  Reference for NETBuilder Family Software

  Using NETBuilder Family Software

If you have questions about the software, the guides, or these release notes, contact 3Com or your network supplier.

For information on the command syntax used in these release notes, see "About This Guide" in *Using NETBuilder Family Software*.

Encryption Packages Notice

The NETBuilder bridge/router software version 11.1 may contain strong data encryption that cannot be exported outside the United States or Canada. It is unlawful to export/re-export or transfer, either physically or electronically, the encryption software or accompanying documentation (or copies thereof) or any product(s) utilizing the encryption software or such documentation without obtaining written authorization from the US Department of Commerce.

Do not place NETBuilder software version 11.1 packages with encryption on networks or servers that are accessible to users outside of the U.S. and Canada.

Software packages with encryption include the following:

- NETBuilder II®

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Multi-protocol Router with 56-bit Encryption (DE)

Multi-protocol Router with 128-bit Encryption (DS)

- SuperStack® II

  IP/IPX/AT Router with 56-bit Encryption (NE) (SI model)

  IP/IPX/AT Router with 128-bit Encryption (NS) (SI model)

  Multi-protocol Router with 56-bit Encryption (CE) (SI model)

  Multi-protocol Router with 128-bit Encryption (CS) (SI model)

  Multi-protocol Router with 56-bit Encryption (TE) (Token Ring models 327 and 527)

- OfficeConnect®

  IP/IPX/AT Router with 56-bit Encryption (NE)

  IP/IPX/AT Router with 128-bit Encryption (NS)

  Multi-protocol Router with Quick Step VPN and 56-bit Encryption (VE)

  Multi-protocol Router with 56-bit Encryption (OE)

  Multi-protocol Router with 128-bit Encryption (OS)

Supported Platforms

NETBuilder software version 11.1 is available for the following platforms:

- NETBuilder II
- SuperStack II NETBuilder models 327 and 527
- SuperStack II NETBuilder SI models 43x, 44x, 45x, 46x, 53x, 54x, 55x, and 56x
- OfficeConnect NETBuilder models 11x, 12x (K and T variants),13x, and 14x (U and ST variants)

New Products

NETBuilder software version 11.1 supports the following new products:

SuperStack II SI 5xx (4-port)

This release integrates the 4-port WAN platform into the NETBuilder software version 11.1 code base, which makes it possible to support all SuperStack II NETBuilder SI, NETBuilder II, OfficeConnect NETBuilder, and SuperStack NETBuilder 327/527 bridge/routers on the same release of software.

Supported PC Flash Memory Cards

Table 1 lists 3Com®–approved vendors of the PC flash memory card.

The 20 MB flash memory card has a formatted capacity of 19.86 MB. For dual image and full dump capability, 3Com recommends using a 20 MB card.

You can also purchase the blank flash memory card from 3Com:

- DPE 20 MB card is 3C6086

Table 1 Approved 20 MB Flash Memory Cards

Vendor and Description	Part Number
Intel Series 2	iMC020FLSA
Intel Series 2+	iMC020FLSP
AMD Series D	AmC020DFLKA

Approved DRAM SIMMs

Table 2 lists 3Com–approved vendors of the 32 MB DRAM SIMM for upgrading the DPE 40 module.

Table 2 3Com–approved DRAM SIMMs

Size	Vendor and Description	Part Number
32 MB 72-pin 8Mx32 60 ns page mode	NEC	MC428000A32B-60
	Toshiba	THM328020S-60
	Toshiba	THM328020B5-60

New Features

This section describes new features in software version 11.1 for the NETBuilder II, SuperStack II, and OfficeConnect NETBuilder bridge/routers.

VPN Features

Layer Two Tunneling Protocol

Layer Two Tunnelling Protocol (L2TP) is a standards-based protocol created from combining two similar but incompatible proprietary tunneling protocols, Point-to-Point Tunneling Protocol (PPTP) and L2F (Cisco's tunneling protocol). L2TP is primarily used in Virtual Private Networking (VPN) environments and allows the creation of a tunnel between a remote site and a central site in order to transport Layer 3 multiprotocol traffic (such as IP, IPX, and AppleTalk) over a public IP network.

L2TP is a connection-oriented protocol that provides flow control, packet sequencing, and retransmission capabilities. The transport network of L2TP can be any packet-oriented network, but for this release, UDP/IP is the supported transport network type. Similar to a PPTP connection, L2TP puts the data inside a PPP frame and then encapsulates the frame with a UDP/IP header.

A notable difference between L2TP and PPTP is that PPTP precedes Layer 3 frames with a GRE header and forwards them to IP via TCP, but L2TP precedes Layer 3 frames with its own protocol header (which looks similar to a GRE header) and forwards them to IP via UDP.

From a security standpoint, L2TP by itself, like PPTP by itself, does not provide data encryption, authentication, or integrity functions (other than those that exist with IP and PPP) that are critical to maintaining VPN privacy. Also, L2TP does not provide a mechanism for key management. These areas are for further development.

IPX RAS

With this release, the NETBuilder RAS service has been extended to include IPX RAS support. The IPX RAS functionality implemented is Proxy routing (unlike IP RAS which can be either LAN Extension or Proxy Routing). The NETBuilder bridge/router routes IPX traffic between the external IPX network and the internal "Proxy" IPX network. All the IPX clients share a single Proxy IPX network and sit logically on the Proxy IPX network. Forwarding IPX traffic to clients is based on the Node ID (MAC address) of each client.

Additional RAS Enhancements

The RAS service has been enhanced in this release to add support for routers acting as RAS clients. Support was added for the RADIUS attributes “Framed_Route” and “Framed_Netmask.” Previous releases of software ignored these attributes when/if the RADIUS server responded with them and provided a "host" address and subnet mask to all RAS callers.

RAS services have been added to the SuperStack II NETBuilder SI (CF package) and the NETBuilder II multiprotocol nonencrypted software (DW package).

Extensible Authentication Protocol

The PPP Extensible Authentication Protocol (EAP) is a general protocol for PPP authentication that supports multiple authentication mechanisms. It is being included in Windows NT 5.0 and simplifies support of token-based authentication. This feature supports customers who use token card authentication systems with NETBuilder bridge/routers as their network access servers. Specifically, only the following authentication methods are supported:

- MD5-Challenge
- Generic Token Card

The Default Authentication Protocol parameter for the PPP Service does not include a configuration option for EAP at the time of the 11.1 release. The functionality will be available in a patch release for 11.1. Contact your 3Com support representative for a patch version of the software that allows you to set this parameter.

DHCP Proxy

During an IPCP negotiation, a remote client may ask for an IP address to be assigned. The IP address can be obtained either through an internal IP address pool or from an external DHCP server. To support dynamic IP address assignment for RAS clients through an external DHCP server, the NETBuilder bridge/router must act as a proxy agent on behalf of each remote client.

Encryption Strength

New levels of encryption strength and algorithms have been added to this release. 3Com has extended the encryption software to support up to 128 bits. RC5 and 3DES-2key have been added to the IPSEC feature set (MPPE will continue to use RC4). For this release of 3DES, the key length is limited to up to 128 bits. In 3DES-2key (the implementation for 11.1) the first key is also used for the last key (first key, second key, first key).

The “strong” encryption software upgrades and hardware ship kits are recognizable via the 3CR number and the package identifiers.

≤ 128 bit support packages/kits contain:

- A package identifier ending in ‘S’ (example, NS)
- A 3CR number containing/ending in ‘92’ (examples, 3CR856792, 3CR6452P92FLASH)

≤ 56 bit support packages/kits contain:

- A package identifier ending in ‘E’ (example, NE)
- A 3CR number containing/ending in ‘91’ (examples, 3CR856791, 3CR6452P91FLASH)

Table 3 contains a summary of the encryption strengths and the associated package ids.

Table 3 Summary of Encryption Strengths

Algorithm	Package ID	Encryption Key Length
RC4	xE	40
	xS	128
RC5	xE	56
	xS	128
DES	xE	56
	xS	56
3DES (2 key)	xS	112

RSVP

RSVP is a dynamic quality of service (QoS) setup protocol that enables IPv4-based real time applications to reserve resources at network nodes along the sender-to-receiver data path to meet its quality of service requirements. RSVP monitors and enforces bandwidth reservations for outbound QoS traffic on PPP and Frame Relay virtual ports. The Phase 1 RSVP message processing engine conforms to RFC 2205 and its application to Integrated Services as defined in RFC 2210. NETBuilder bridge/router-specific flow admission control, packet classification, and packet scheduling mechanisms are implemented to provide the controlled-load QoS control services as specified in RFC 2211. Both IPv4 unicast and multicast (over DVMRP/MOSPF domains) flows are supported.

New and Enhanced Protocol Features

This section describes new and enhanced protocol features.

Virtual Router Redundancy Protocol (VRRP) Phase 2

The Virtual Router Redundancy Protocol (VRRP) is designed to eliminate the single point of failure inherent in the static default routed environment. VRRP specifies an election protocol that dynamically assigns responsibility for a virtual router to one of the VRRP routers on a LAN. This is the second phase of VRRP. This phase adds FDDI to the currently supported media (Ethernet and Fast Ethernet). Phase II (similar to the initial implementation) will not support source route for VRRP advertisements (that is, the VRRP routers that belong to the same VRID cannot be separated by source route bridges.)

Virtual Circuit Prioritization

Frame Relay Virtual Circuit Prioritization extends the current queue handling capabilities of PPP ports to Frame Relay virtual circuits. The FR virtual circuit can be either a FR virtual port or a virtual circuit associated only with the parent port. All of the queue policies, Priority Queuing, and Protocol Reservation are supported. In addition to the currently supported policies, a metering algorithm has been added. If the queue handler detects that the underlying bandwidth exceeds a certain threshold specified, then the queueing and metering functions are effectively bypassed and packets are transmitted directly without queuing. This optimizes high-speed interfaces in which the customer assumes that everything presented to the interface can be transmitted without going through the prioritization or metering processing and without much fear of packet loss.

Firewall Enhancements

The recent enormous growth in the Internet has increased the security risks to corporate and government networks. The existing Firewall Service has been enhanced to support more predefined filters for popular applications, to allow you to create your own filter definitions, and to combine noncontiguous IP addresses into named groups to which firewall policies may be applied.

Firewall enhancements include:

- Predefined service filters for multimedia applications such as Real Networks' RealPlayer.
- The ability to define a service and group of IP addresses.
- Support for traceroute.
- Additional predefined service filters.
  - Secure HTTP
  - BGP-4
  - Finger
  - Whois
  - SOCKS
- DNS client-to-server.
- IPSEC support for Encapsulated Security Payload (ESP) headers and Authentication Headers (AH).

IP Version 6 (Phase II)

IPv6 Phase II features include the BGP-4 multiprotocol extensions for IPv6 inter-domain routing plus native IPv6 routing over PPP and point-to-point ATM PVCs.

BGP-4 Enhancements

Enhancements have been incorporated that address the scaling issues with the current BGP implementation. The new implementation also includes BGP-4+ features. BGP-4+ is an extension to the existing BGP protocol for handling multiprotocol routing. For example, it enables interdomain routing of IPv4 multicast, IPv6 unicast, and IPv6 multicast network layers. The following network layer reachability information attributes are implemented:

- Multiprotocol Reachable NLRI
- Multiprotocol Unreachable NLRI

OSPF Not-So-Stubby-Area (NSSA)

For inter-area routing, the Area Border Router (the only attachment to the backbone for leaf sites) advertised a default route. However, when fairly complex leaf sites are connected to the backbone via a Stub Area, inter-area routing into and out of the leaf site is not optimal with only a default route. RFC 1587 proposes a new kind of area known as NSSA (Not-So-Stubby-Area) to address this problem. NETBuilder software version 11.1 implements this new functionality.

Frame Relay PVC Q.933 Support

ITU Q.933 Annex A Frame Relay PVC signaling is the latest defined by ITU that supports asynchronous bidirectional PVC control procedure. With the implementation of this new signaling standard, you can signal the network for the activation or deactivation of individual PVCs. Additionally, you can query the network regarding the operational status of the PVC. Q.933 Annex A is a super set of the existing LMI supported in the NETBuilder bridge/router platforms.

Data Over Voice (B-Channel ISDN Specification)

This feature enables the bridge/router to initiate an ISDN 56 Kbps data call over the ISDN voice bearer channel. Connection at the remote end must be able to accept the incoming call and supply the proper signal to disable echo suppressors. This feature is sometimes referred to as Switched 56 Permissive mode or TollSaver. See “Placing a Data Over Voice Call” on page 17 for brief description of how to use this feature.

System Features

This release implements the following general system features.

Boundary Router Remote LAN Detection

Central site support of Boundary Routing Architecture has been enhanced to detect the LAN media type of the connected remote boundary routers.

MBRI Digi64S2 Support

This release implements the German dual point-to-point leased line switch specification Digi64S2, on the NETBuilder II bridge/router 8-port BRI Module. Digi64S2 was implemented in prior releases of the OfficeConnect NETBuilder bridge/router and SuperStack II NETBuilder SI bridge/router product lines containing ISDN interfaces. This feature allows each ISDN port on the NETBuilder to be connected to either the same or different remote node locations as a leased line. See “Digi64S2” on page 18 for a brief description of how to use this feature.

Legacy/ATM Features

This software release implements the following legacy and ATM features.

Multiprotocol over ATM (MPOA)

An ATM network can be divided into multiple logical internet subnets (LISs) or emulated LANs (ELANs), which requires that all ELAN traffic go through routers that are connected to the ELANs. The NETBuilder II bridge/router in a LAN emulation topology is used to perform the routing between the ELANs in which the NETBuilder II bridge/router has joined. On a large site, it is quite likely that there would be two or more routers on the data path between the edge devices. If the two edge devices are both physically attached to the same ATM network fabric, then the edge devices should be able to communicate directly with each other, bypassing one or more intermediate routers in the data path.

Multiprotocol Over ATM (MPOA) is used to bypass the intermediate routers. It allows the edge devices to resolve their ATM address and setup the short-cut connections between each other. MPOA consists of the MPOA server (co-located with routers) and the MPOA client (co-located with edge devices). The NETBuilder II bridge/router serves as an MPOA server, which provides the information required by MPOA clients (edge devices) to setup the short-cut connections.

Token Ring in Fast Ethernet (TIFE)

Token Ring in Fast Ethernet (TIFE) is a method for tunneling token ring frames, including source route information, through a Fast Ethernet network. For customers with an existing token ring infrastructure, TIFE provides a gradual migration path to an Ethernet LAN, preserving the investment in capital equipment and source route sensitive applications. For the NETBuilder bridge/router, TIFE provides a means to support token ring media without requiring a token ring interface. In addition, the 802.1Q VLAN support required for TIFE allows the routing protocols to access Ethernet and Fast Ethernet VLANs. (VLAN over FDDI or token ring is not supported with this release.)

Network Management Features

This release adds the following new network management features.

ASCII Boot

The ASCII LoadConfigs feature on the NETBuilder bridge/router has been expanded to provide a way for an ASCII text file to be executed automatically when the router is booted. Along with this new functionality, a new Transcend® Network Application Tool (available Fall 1998) called NETBuilder Configurator, will provide an easy mechanism for setting up multiple routers to use the ASCII boot feature. NETBuilder Configurator will provide a straightforward spreadsheet GUI interface for you to build and deploy ASCII text files based on custom made templates.

The ASCII boot feature simplifies the management of a network allowing you to mange the configuration of your own router with a single ASCII text configuration file.

56/64K CSU/DSU External Loopback

OfficeConnect NETBuilder and SuperStack II SI NETBuilder bridge/router platforms with a CSU/DSU option installed have a new remote loopback capability. The remote loopback functions include Remote CSU Loopback and Remote DSU Loopback. The Remote Loopback can be started/terminated via SNMP. The Remote initiated Local V54 loopback has the same functionality as the existing V54 Loopback from the console.

NETBuilder Web Link Improvements

The NETBuilder Web Link application has been improved to include the following enhancements:

- Improved error handling
- Help frame resizing now persists across page changes
- A logout icon for improved security
- Port list support
- Support for user-level password changing

Upgrade Management Utilities and NETBuilder Upgrade Link

The remote upgrade process consists of providing customers with a reliable, easy, and clearly defined way of upgrading their NETBuilder bridge/routers to a newer version of software and/or firmware. The following changes have been implemented in this release:

- Default support for upgrades from 8.x, 9.x, 10.x, or 11.0 to version 11.1
- Support for FTP file transfers
- Named backup and restores
- Improved Upgrade Link user interface with the following:
  - FTP file transfers
  - Stage control
  - Ability to delete old packages
  - Ability to run in client/server mode

See "NETBuilder Upgrade Management Utilities" on page 30 for more information and *Upgrading NETBuilder Family Software* for Upgrade Link operating instructions.

Flash Load

The prior (software versions 11.0 and earlier) flash load process was limited to formatting the on-board Flash PROM file storage and copying the bundle image to the firmware and the NETBuilder core boot file onto the file system. With the introduction of Web, this process needed to be modified to include flash copying all the appropriate Web Link files as well. This feature allows for multiple file loading support with the flash load command. This functionality is limited to the OfficeConnect NETBuilder and SuperStack II SI NETBuilder bridge/router platforms.

New Features Application Notes

This section provides application notes for the following features:

- Data over Voice (B-Channel ISDN Specification)
- Digi64S2
- ASCII Boot

Placing a Data Over Voice Call

In many areas, voice calls over ISDN are charged at a lower rate than data calls. This release of software allows you to specify that calls to a given number be established as voice calls. This feature is sometimes referred to as a TollSaver capability. Telephone companies often refer to this type of call as Switched 56 Permissive. The answering device must be capable of generating the 2.1KHz tone needed to disable any echo cancellers on the line. Consult with the owner of the destination equipment to see whether it has this capability.

In order to configure this feature, you must define the DialNoList entry with a type of BriV, by entering:

```
ADD !<port> -POrt DialNoList "<phone number>" Type=BriV
```

The Baud specifier in the ADD command, although not disallowed, is ignored if present. Data sent over the B channel will only be sent at 56 Kbps.

Example

To place a data over voice call on port 2 to an ISP with the phone number 453-4444, enter:

```
ADD !2 -POrt DialNoList “4534444” Type=BriV
DIal !2
```

Digi64S2 There are two ISDN leased line linetypes for ISDN lease lines in Germany: Digi64S and Digi64S2. Digi64S can run only on the B1 channel, but Digi64S2 can run on both the B1 and the B2 channels.

1 To enable the Digi64S2 feature, first set the linetype parameter to Digi64S2. Type:

```
SETDefault !2.1 -PAth LineType = Digi64S2 ( abbreviated d64s2 )
SETDefault !2.2 -PAth LineType = Digi64S2
```

2 Toggle the respective paths. Type:

```
SETDefault !2.1 -PAth cont=e
SETDefault !2.2 -PAth cont=e
```

Path 2.1 is mapped to the B1 channel and path 2.2 is mapped to the B2 channel. This mapping is not interchangeable.

If one of the paths is set to Digi64S2, the path in the same connector line is also set to Digi64S2. Mixtures of line types within a single connector are not supported.

3 On systems using the HSS 8 port BRI module, make the paths static before you change the line type.

```
SETDefault !2e.1 -PAth DialCONTrol=STAtic
SETDefault !2e.2 -PAth DialCONTrol=STAtic
ADD !2e.1 -POrt PAth 2e.1
ADD !2e.2 -POrt PAth 2e.2
SETDefault !2e.1 -PAth LineType=Digi64s2 CONTrol=e
SETDefault !2e.2 -PAth LineType=Digi64s2 CONTrol=e
```

ASCII Boot The LoadConfigs function has been enhanced to provide a way to maintain the configuration of the router in a single ASCII text file. During router initialization, the old configuration is deleted, and the router is reconfigured from scratch by executing an ASCII text file. This feature is invoked by setting up the ASCII text file in the configuration directory with the name BOOT.CFG.

WARNING: *For network security, do not include security sensitive information such as passwords. The ASCII text file is not encyrpted, which means the passwords are readable by anyone who has access to the file.*

When the router is booted and the BOOT.CFG file is detected in the configuration directory, all existing configuration files (except CCSMACRO and IOXM) in the configuration directory are deleted. The configuration commands in the BOOT.CFG file are then executed. If a configuration command fails to execute successfully, it does not stop, but continues with the next configuration command. Just as when you enter a configuration command on the command line, new encoded configuration files are created. As long as the file BOOT.CFG is detected in the configuration directory, this operation is repeated every time the router is rebooted.

To suspend this operation and use the encoded configuration files when the router is rebooted, the BOOT.CFG file can be renamed (ReName command is now supported by LoadConfigs) as the last command in the BOOT.CFG file.

To minimize the impact of executing configuration commands at boot time, the configuration commands are not displayed. However, as with normal LoadConfigs operations, a log file is created, which contains the configuration commands that were executed along with any comments from the BOOT.CFG file and system messages that may have been generated.

If the router has intelligent I/O modules (6 port Ethernet, ATM module, Multiport BRI modules), they are loaded before any of the commands are executed. The "System Initialized and Running" message is not displayed (that is, no user interaction is possible) until after all of the commands in the BOOT.CFG file have executed. If the ASCII boot feature has been invoked, a message appears as part of the SysconF command Boot Statistics information to indicate this.

Configuration changes executed after the router is booted are not automatically captured in the BOOT.CFG file and would be lost if the router was rebooted. Also, the execution of the ASCII boot feature does not affect any macros that have been defined or the SysconF configuration.

After booting with the boot.cfg file, any changes made to the device via telnet, console, SNMP, or web interface are not saved to the boot.cfg file. It is recommended that you make all changes in the boot.cfg file directly.

11.1 Software Packages

The tables in this section list the features in the packages available in software version 11.1 for the NETBuilder bridge/router platforms.

NETBuilder II

Table 4 lists the software features of each package for NETBuilder II bridge/routers.

Table 4 NETBuilder II Software Features

	Software Package			
Feature	APPN/Connection Services (AC)	Multiprotocol Router (DW)	Multiprotocol Router with 56-bit Encryption (DE)	Multiprotocol Router with 128-bit Encryption (DS)
Bridging	X	X	X	X
Boundary Routing® central node	X	X	X	X
Routing Protocols				
IPv4	X	X	X	X
IPv6		X	X	X
IP services:				
Multicast IP	X	X	X	X
OSPF	X	X	X	X
Network Address Translation (NAT)	X	X	X	X
BGP		X	X	X
VRRP	X	X	X	X
DHCP	X	X	X	X
DHCP Proxy	X	X	X	X
RIP/RIP v2/NTP	X	X	X	X
IP connection services	X			
RSVP	X	X	X	X
IP security:				
IPsec			X	X
DES			X	X
3DES				X
RC5			X	X
MPPE/RC4			X	X
MS-CHAP		X	X	X
Firewall	X	X	X	X
RAS		X	X	X
IPX RAS		X	X	X
RAS Traps		X	X	X
IPX	X	X	X	X
XNS	X	X	X	X
OSI	X	X	X	X
OSI connection services	X			
VINES		X	X	X
DECnet		X	X	X
AppleTalk	X	X	X	X
WAN Protocols				
PPP/Multilink PPP	X	X	X	X
PPTP	X	X	X	X
L2TP	X	X	X	X
EAP		X	X	X

Table 4 NETBuilder II Software Features (continued)

	Software Package			
Feature	APPN/Connection Services (AC)	Multiprotocol Router (DW)	Multiprotocol Router with 56-bit Encryption (DE)	Multiprotocol Router with 128-bit Encryption (DS)
Frame Relay	X	X	X	X
SMDS	X	X	X	X
X.25	X	X	X	X
X.25 switching/tunneling	X	X	X	X
IBM Protocols				
APPN	X			
DLSw	X	X	X	X
BRITSS	X	X	X	X
LAA	X	X	X	X
LNM	X	X	X	X
Polled ASYNC/ BISYNC Passthrough	X	X	X	X
NetView Service Point		X	X	X
SDLC	X	X	X	X
SHDLC	X	X	X	X
BSC conversion		X	X	X
QLLC/LLC2 conversion		X	X	X
Other Features				
FTP	X	X	X	X
Data over Voice				
MPOA	X	X	X	X
ASCII Boot	X	X	X	X
Zmodem	X	X	X	X
Dial-on-demand	X	X	X	X
Web Link	X	X	X	X
Virtual Ports (512 max.)	X	X	X	X
ISDN	X	X	X	X
TIFE	X	X	X	X

NETBuilder II Firmware Requirements

The NETBuilder II I/O modules require firmware upgrades to support the NETBuilder software version 11.1 (see Table 5 for firmware requirements).

You can determine your I/O module firmware version through the software by entering:

```
SHow -SYS IOI
```

Table 5 NETBuilder II Firmware Requirements

Module	11.1 Firmware Version Strings
DPE	FW/DPE-BOOT1,1.4 FW/DPE-BOOT2,1.4
MP 6-port Ethernet	FW/6ETH-FW,1.4.0.70
Fast Ethernet 100Base	FW/ETH100-FW,1.9
BRI 8-port	FW/8BRI-FW,1.2
MP ATMLink	FW/ATM-FW,1.1.0.70

Table 5 NETBuilder II Firmware Requirements

Module	11.1 Firmware Version Strings
HSS 3-port (V.35)	FW/HSS3-V35,1.1.9
HSS 3-port (RS449)	FW/HSS3-449,1.1.9
HSS 3-port (RS232)	FW/HSS3-232,1.1.9
HSS 4-port	FW/4PORTWAN-FW,1.2

SuperStack II SI Table 6 lists the software features of each package for SuperStack II SI bridge/routers.

Table 6 SuperStack II NETBuilder SI Software Features

	Model and Software Package							
Feature	**432, 442, 452, 462, 532, 542, 552, 562** IP/IPX/AT Router (NW)	**432, 442, 452, 462, 532, 542, 552, 562** IP/IPX/AT Router with 56-bit Encryption (NE)	**432, 442, 452, 462, 532, 542, 552, 562** IP/IPX/AT Router with 128-bit Encryption (NS)	**431, 441, 451, 461** Boundary Router (BF)	**437, 447, 457, 467, 537, 547, 557, 567** Multi-protocol Router (CF)	**437, 447, 457, 467, 537, 547, 557, 567** Multi-protocol Router with 56-bit Encryption (CE)	**437, 447, 457, 467, 537, 547, 557, 567** Multi-protocol Router with 128-bit Encryption (CS)	**438, 448, 458, 468** APPN/ Connection Services (AX)
Bridging	X	X	X	X	X	X	X	X
Boundary Routing® central node					X	X	X	
Boundary Routing leaf node				X				
Routing Protocols								
IPv4	X	X	X		X	X	X	X
IP services:								
Multicast IP	X	X	X		X	X	X	X
OSPF	X	X	X		X	X	X	X
Network Address Translation (NAT)	X	X	X		X	X	X	X
BGP								
VRRP	X	X	X		X	X	X	X
DHCP	X	X	X		X	X	X	X
DHCP Proxy	X	X	X		X	X	X	X
RIP/RIP v2/NTP	X	X	X	X	X	X	X	X
IPCP	X	X	X		X	X	X	X
IP connection services								X
IP security:								
IPsec		X	X			X	X	
DES		X	X			X	X	
3DES			X				X	
RC5		X	X			X	X	
MPPE/RC4		X	X			X	X	
MS-CHAP	X	X	X		X	X	X	
Firewall	X	X	X		X	X	X	X
RAS		X	X		X	X	X	
IPX RAS		X	X		X	X	X	

Table 6 SuperStack II NETBuilder SI Software Features (continued)

	Model and Software Package							
Feature	**432, 442, 452, 462, 532, 542, 552, 562** IP/IPX/AT Router (NW)	**432, 442, 452, 462, 532, 542, 552, 562** IP/IPX/AT Router with 56-bit Encryption (NE)	**432, 442, 452, 462, 532, 542, 552, 562** IP/IPX/AT Router with 128-bit Encryption (NS)	**431, 441, 451, 461** Boundary Router (BF)	**437, 447, 457, 467, 537, 547, 557, 567** Multi-protocol Router (CF)	**437, 447, 457, 467, 537, 547, 557, 567** Multi-protocol Router with 56-bit Encryption (CE)	**437, 447, 457, 467, 537, 547, 557, 567** Multi-protocol Router with 128-bit Encryption (CS)	**438, 448, 458, 468** APPN/ Connection Services (AX)
RAS Traps		X	X		X	X	X	
IPX	X	X	X		X	X	X	X
XNS					X	X	X	X
OSI					X	X	X	X
OSI connection services								X
VINES					X	X	X	
DECnet					X	X	X	
AppleTalk	X	X	X		X	X	X	X
BR Remote LAN Detection				X				
WAN Protocols								
PPP/Multilink PPP	X	X	X	X	X	X	X	X
PPTP	X	X	X		X	X	X	X
L2TP	X	X	X		X	X	X	X
EAP		X	X		X	X	X	
Frame Relay	X	X	X	X	X	X	X	X
SMDS	X	X	X		X	X	X	
X.25	X	X	X	X	X	X	X	X
X.25 switching/tunneling	X	X	X		X	X	X	X
IBM Protocols								
APPN								X
DLSw				X	X	X	X	X
BRITSS				X	X	X	X	X
LAA	X	X	X	X	X	X	X	X
NetView Service Point					X	X	X	
Polled ASYNC/ BISYNC Passthrough				X	X	X	X	X
SDLC				X	X	X	X	X
SHDLC				X	X	X	X	X
BSC conversion					X	X	X	
QLLC/LLC2 conversion				X	X	X	X	X
Other Features								
Data over Voice	X	X	X	X	X	X	X	X
CSU/DSU Loopback	X	X	X		X	X	X	X
FTP	X	X	X	X	X	X	X	X
Zmodem	X	X	X	X	X	X	X	X
Dial-on-demand	X	X	X	X	X	X	X	X
Web Link	X	X	X	X	X	X	X	X
ASCII BOOT	X	X	X	X	X	X	X	X
TIFE	X	X	X	X	X	X	X	X

Table 6 SuperStack II NETBuilder SI Software Features (continued)

Feature	Model and Software Package							
	432, 442, 452, 462, 532, 542, 552, 562 IP/IPX/AT Router (NW)	**432, 442, 452, 462, 532, 542, 552, 562** IP/IPX/AT Router with 56-bit Encryption (NE)	**432, 442, 452, 462, 532, 542, 552, 562** IP/IPX/AT Router with 128-bit Encryption (NS)	**431, 441, 451, 461** Boundary Router (BF)	**437, 447, 457, 467, 537, 547, 557, 567** Multi-protocol Router (CF)	**437, 447, 457, 467, 537, 547, 557, 567** Multi-protocol Router with 56-bit Encryption (CE)	**437, 447, 457, 467, 537, 547, 557, 567** Multi-protocol Router with 128-bit Encryption (CS)	**438, 448, 458, 468** APPN/ Connection Services (AX)
Flash Load	X	X	X	X	X	X	X	X
Virtual Ports (48 max.)	X	X	X	X	X	X	X	X
Memory Requirements								
DRAM:	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB
Flash memory:	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB

SuperStack II Token Ring

Table 7 lists software features for each package for the SuperStack II bridge/routers.

Table 7 SuperStack II NETBuilder Ethernet and Token Ring Features

Features	Models 327 (Token Ring)	Models 527 (Token Ring)
	Multiprotocol Router with 56-bit Encryption (TE)	Multiprotocol Router with 56-bit Encryption (TE)
Bridging	X	X
Boundary Routing® central node	X	X
Routing Protocols		
IPv4	X	X
IP services:		
Multicast IP	X	X
OSPF	X	X
Network Address Translation (NAT)	X	X
DHCP	X	X
DHCP Proxy	X	X
RIP/RIP v2/NTP	X	X
VRRP		
IP security:		
IPsec	X	X
Firewall	X	X
IPX	X	X
XNS	X	X
OSI	X	X
VINES	X	X
DECnet	X	X
AppleTalk	X	X

Table 7 SuperStack II NETBuilder Ethernet and Token Ring Features (continued)

Features	Models 327 (Token Ring)	Models 527 (Token Ring)
WAN Protocols		
PPP/Multilink PPP	X	X
PPTP	X	X
L2TP	X	X
Frame Relay	X	X
SMDS	X	X
X.25	X	X
X.25 switching/tunneling	X	X
IBM Protocols		
DLSw	X	X
BRITSS	X	X
LAA	X	X
Polled ASYNC/BISYNC Passthrough	X	X
SDLC	X	X
SHDLC	X	X
QLLC/LLC2 conversion	X	X
Other Features		
FTP	X	X
Dial-on-demand	X	X
Data over voice		X
Web Link	X	X
Virtual Ports (28 max.)	X	X
Memory Requirements		
DRAM:	16 MB	16 MB
Flash memory for automatic recovery when upgrading:	4 MB	8 MB
Flash memory for manual recovery when upgrading:	4 MB	4 MB

OfficeConnect

Table 8 and Table 9 list software features for each package for OfficeConnect bridge/routers.

Table 8 OfficeConnect NETBuilder Software Features

	Model and Software Package					
Feature	**120** FRAD (FD)	**112, 122, 132, 142** IP/IPX/AT Router (NW)	**112, 122, 132, 142** IP/IPX/AT Router with 56-bit Encryption (NE)	**112, 122, 132, 142** IP/IPX/AT Router with 128-bit Encryption (NS)	**111, 121, 131, 141** Boundary Router (BF)	**145** Quick Step VPN Router with 56-bit Encryption (VE)
Bridging	X	X	X	X	X	X
Boundary Routing® central node						
Boundary Routing leaf node					X	

Table 8 OfficeConnect NETBuilder Software Features (continued)

	Model and Software Package					
	120	**112, 122, 132, 142**	**112, 122, 132, 142**	**112, 122, 132, 142**	**111, 121, 131, 141**	**145**
Feature	FRAD (FD)	IP/IPX/AT Router (NW)	IP/IPX/AT Router with 56-bit Encryption (NE)	IP/IPX/AT Router with 128-bit Encryption (NS)	Boundary Router (BF)	Quick Step VPN Router with 56-bit Encryption (VE)
Routing Protocols						
IPv4	X	X	X	X		X
IP services:						
Multicast IP	X	X	X	X		X
OSPF	X	X	X	X		X
Network Address Translation (NAT)	X	X	X	X		X
VRRP		X	X	X		X
DHCP		X	X	X		X
RIP/RIP v2/NTP	X	X	X	X	X	X
DHCP Proxy		X	X	X		X
IPCP		X	X	X		X
IP security:						
IPsec			X	X		X
DES			X	X		X
3DES				X		
RC5			X	X		X
Firewall	X	X	X	X		X
IPX		X	X	X		X
XNS						
OSI						
VINES						
DECnet						
AppleTalk		X	X	X		X
BR Remote LAN Detection					X	
WAN Protocols						
PPP/Multilink PPP	X	X	X	X	X	X
PPTP		X	X	X		X
L2TP		X	X	X		X
Frame Relay	X	X	X	X	X	X
SMDS		X	X	X		X
X.25	X	X	X	X	X	X
X.25 switching/tunneling	X	X	X	X		X
IBM Protocols						
APPN						
DLSw	X				X	
BRITSS	X				X	
LAA	X	X	X	X	X	X
NetView Service Point	X					
Polled ASYNC/ BISYNC Passthrough	X				X	
SDLC	X				X	

Table 8 OfficeConnect NETBuilder Software Features (continued)

	Model and Software Package					
Feature	**120** FRAD (FD)	**112, 122, 132, 142** IP/IPX/AT Router (NW)	**112, 122, 132, 142** IP/IPX/AT Router with 56-bit Encryption (NE)	**112, 122, 132, 142** IP/IPX/AT Router with 128-bit Encryption (NS)	**111, 121, 131, 141** Boundary Router (BF)	**145** Quick Step VPN Router with 56-bit Encryption (VE)
SHDLC	X				X	
BSC conversion	X					
QLLC/LLC2 conversion	X				X	
Other Features						
FTP	X	X	X	X	X	X
Data over Voice	X	X	X	X	X	X
CSU/DSU Loopback		X	X	X		X
Zmodem	X	X	X	X	X	X
Dial-on-demand	X	X	X	X	X	X
Quick Step VPN application						X
ASCII Boot	X	X	X	X	X	X
Flash Load	X	X	X	X	X	X
Web Link	X	X	X	X	X	X
Virtual Ports (28 max.)	X	X	X	X	X	X
Memory Requirements						
DRAM:	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB
Flash memory for automatic recovery when upgrading:	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB
Flash memory for manual recovery when upgrading:	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB

Table 9 Additional OfficeConnect NETBuilder Models Software Features

Feature	**116, 126, 136, 146** APPN (AF)	**117, 127, 137, 147** Multiprotocol Router (OF)	**117, 127, 137, 147** Multiprotocol Router with 56-bit Encryption (OE)	**117, 127, 137, 147** Multiprotocol Router with 128-bit Encryption (OS)
Bridging	X	X	X	X
Boundary Routing® central node		X	X	X
Boundary Routing leaf node				
Routing Protocols				
IPv4	X	X	X	X
IP services:				

Feature	**116, 126, 136, 146** APPN (AF)	**117, 127, 137, 147** Multiprotocol Router (OF)	**117, 127, 137, 147** Multiprotocol Router with 56-bit Encryption (OE)	**117, 127, 137, 147** Multiprotocol Router with 128-bit Encryption (OS)
Multicast IP	X	X	X	X
OSPF	X	X	X	X
Network Address Translation (NAT)	X	X	X	X
VRRP	X	X	X	X
DHCP	X	X	X	X
DHCP Proxy	X	X	X	X
RIP/RIP v2/NTP	X	X	X	X
IPCP	X	X	X	X
IP security:				
IPsec			X	X
DES			X	X
3DES				X
RC5			X	X
Firewall	X	X	X	X
IPX	X	X	X	X
XNS		X	X	X
OSI		X	X	X
VINES		X	X	X
DECnet		X	X	X
AppleTalk	X	X	X	X
WAN Protocols				
PPP/Multilink PPP	X	X	X	X
PPTP	X	X	X	X
L2TP	X	X	X	X
Frame Relay	X	X	X	X
SMDS		X	X	X
X.25	X	X	X	X
X.25 switching/tunneling	X	X	X	X
IBM Protocols				
APPN	X			
DLSw	X	X	X	X
BRITSS	X	X	X	X
LAA	X	X	X	X
NetView Service Point		X	X	X
Polled ASYNC/ BISYNC Passthrough	X	X	X	X
SDLC	X	X	X	X
SHDLC	X	X	X	X
BSC conversion		X	X	X
QLLC/LLC2 conversion		X	X	X
Other Features				
Data over Voice	X	X	X	X
CSU/DSU Loopback	X	X	X	X
FTP	X	X	X	X

Feature	**116, 126, 136, 146** APPN (AF)	**117,127, 137, 147** Multiprotocol Router (OF)	**117, 127, 137, 147** Multiprotocol Router with 56-bit Encryption (OE)	**117, 127, 137, 147** Multiprotocol Router with 128-bit Encryption (OS)
Zmodem	X	X	X	X
Dial-on-demand	X	X	X	X
Quick Step VPN application				
ASCII Boot	X	X	X	X
Flash Load	X	X	X	X
Web Link	X	X	X	X
Virtual Ports (28 max.)	X	X	X	X
Memory Requirements				
DRAM:	16 MB	16 MB	16 MB	16 MB
Flash memory for automatic recovery when upgrading:	8 MB	8 MB	8 MB	8 MB
Flash memory for manual recovery when upgrading:	4 MB	4 MB	4 MB	4 MB

Item Not Supported

The NETBuilder software version 11.1 does not support the following bridge/routers:

- SuperStack II NETBuilder 227 Full Router (Ethernet)
- SuperStack II NETBuilder 427 Router (Ethernet, ISDN)

NETBuilder Upgrade Management Utilities

This section includes information about NETBuilder software version 11.1 NETBuilder Upgrade Management Utilities. Upgrade Link is a graphical interface-based application designed to simplify upgrading the NETBuilder bridge/router operating software.

The NETBuilder software version 11.1 NETBuilder Upgrade Management Utilities support upgrades from NETBuilder bridge/routers running version 8.x through 11.0.1. If you need to upgrade from version 7.x to 11.1, you need to perform the upgrade in two steps. The first step requires upgrading from 7.x to 9.3.1. After the NETBuilder bridge/router configuration files have been converted to 9.3.1, they can then be further upgraded to support the 11.1 release. The 9.3.1 Remote Upgrade Utilities and manual are available on the 3Com InfoDeli website.

Downloading NETBuilder Upgrade Management Utilities

The NETBuilder Upgrade Management Utilities is shipped on the CD-ROM with every NETBuilder software release. In addition, the NETBuilder Upgrade Management Utilities can be downloaded from the FTP site (ftp.3com.com), from the World Wide Web access through http://infodeli.3com.com/, or from the 3Com bulletin board service (BBS) under Software Downloads, System Software. The files range in size from 1 MB to 4 MB per file and are usually easier and faster to retrieve using the FTP site.

UNIX Files

The NETBuilder Upgrade Management Utilities are UNIX files compressed with the UNIX compress utility. To use the downloaded files, you must first expand the files using the UNIX decompress utility. For instructions on how to download and decompress the utilities, see the ruu111.txt file.

The UNIX files are as follows:

ruusol111.1 Contains the UNIX-compressed NETBuilder Upgrade Management Utilities for the Solaris 2.5 platforms.

ruuhp111.1 Contains the UNIX-compressed NETBuilder Upgrade Management Utilities for the HP-UX 10.x platforms.

ruuaix111.1 Contains the UNIX-compressed NETBuilder Upgrade Management Utilities for the IBM AIX 4.1.1 through 4.2.X platforms.

ruu111.txt Contains the instructions for downloading and decompressing the NETBuilder Upgrade Management Utilities. This file also contains instructions on how to integrate the utilities into the Transcend Enterprise Manger application.

Windows Files

The NETBuilder Upgrade Management Utilities are Windows files compressed with a compression utility. To use the downloaded files, you must first expand them using the decompress utility PKUNZip. PKUNZip can be downloaded from the following URLs:

```
http://www.pkware.com
```

or

`http://infodeli.3com.com/infodeli/swlib`

For instructions on how to decompress and install the utilities, see the ruu111.txt file.

The Windows files are as follows:

ruu111.zip	Contains the compressed NETBuilder Upgrade Management Utilities for Windows95 and Windows NT version 4.0 platforms.
ruu111.txt	Contains the instructions for downloading and decompressing the NETBuilder Upgrade Management Utilities. This file also contains instructions on how to integrate the utilities into the Transcend Enterprise Manger application.

Executing profile.bat

When using the 11.1 NETBuilder Upgrade Management Utilities from a Windows command line, you must execute the profile.bat (/user/3com/common/data/profile.bat) file. This file sets up the path to \usr\3com\common\bin where the utilities reside. Alternatively you can reboot your system so that the changed in the a autoexec.bat file can take effect.

Version 11.1 NETBuilder Upgrade Management Utilities

The upgrade utilities, Transcend Enterprise Manager for Windows 95 v 6.1, and Transcend Enterprise Manager for Windows 97 NT are available for use on Windows 95 and Windows NT platforms. These utilities also support Transcend Enterprise Manager for UNIX version 4.2.1 and 4.2.2. This implementation is provided in addition to the existing platform support within Transcend Enterprise Manager for UNIX. The Upgrade Management Utilities are designed to work with or without Transcend Enterprise Manager Network Admin Tools. see *Upgrading NETBuilder Family Software* for details about integrating the Upgrade Management Utilities into the Transcend Enterprise Manager.

Upgrading to 11.1 Utilities with Transcend Enterprise Manager

If you have Transcend Enterprise Manager and you installed NETBuilder bridge/router software on the network management station, you must reinstall the NETBuilder bridge/router software package *after* upgrading to the version 11.1 utilities.

The proper installation order for integrating the Upgrade Management Utilities into the Transcend Enterprise Manager is:

1. Install and start Transcend Enterprise Manager. Then, stop the Transcend Enterprise Manager.
2. Install the Upgrade Management Utilities using bcmsetup. Do this if Transcend Enterprise Manager does not have the Upgrade Management Utilities bundled or if you want to install a newer version of the Upgrade Management Utilities.
3. Install the NETBuilder software package using the Upgrade Link installation dialog.
4. Start Transcend Enterprise Manager. The Transcend Upgrade Manager, Baseline Manager, and Alarm Manager will then support the latest NETBuilder software version.

Upgrade Management Known Issues

This section contains known upgrade management issues.

bcmdiagnose Error Message

When you execute bcmdiagnose on HP-UX and the TFTP server is configured to use the Safe Directory method, the error message "No TFTP user found in /etc/passwd. You must add an entry" can be ignored.

Installation of a new version of the Remote Upgrade Utilities onto a UNIX NMS saves an existing /usr/3Com/bcmutil.conf, into /etc/3Com/bcmutil.conf.backup. This file is used by the Transcend Enterprise Manager for UNIX (TEM/U). If a user has made modifications to this file, they must either restore their original file or add the changes to the new file.

If you are using the Remote Upgrade Utilities in stand-alone mode or with the Transcend Enterprise Manager for UNIX (TEM/U), you can specify SNMP community strings of different devices in /etc/snmp.cfg file. More information about the snmp.cfg file can be found in the help pages (file://usr/3Com/bcm/gui/hlp/bcm-intro.html).

Unreleased Netscape Communicator Version

The NETBuilder software version 11.1 Upgrade Management Utilities requires an unreleased version of Netscape Communicator, 4.05 Preview Release 1 (AWT 1.1.5). This version may be obtained from the following Netscape web site:

http://home.netscape.com/download

SuperStack II NETBuilder Token Ring Upgrades

If SuperStack II NETBuilder systems that are running software version 8.3 have a boot image named "bundle.68K," the SuperStack II NETBuilder Token Ring system is not upgradable to software version 11.1 unless the sys file is present on the flash drive. To work around this, either rename the image to "boot.68k," or copy the 8.3 sys file to the primary boot directory on the NETBuilder bridge/router.

Sysupgrade Not Supported

Sysupgrade is no longer a supported upgrade management utility. Use of the files upgrade.29k and upgrade.68k is not supported in this release.

IP Address Link

When using the Upgrade Management Utilities in a hardware replacement upgrade, you must use the same IP address as previously used for the router if you have already backed up your software onto the network management station. Using a different IP address causes the upgrade to fail.

Concurrent Usage

The NETBuilder Upgrade Management Utilities are currently designed to run sequentially. Running multiple simultaneous instances of bcmbackup, bcmsysupgrade, bcmrestore, and bcmdiagnose is not supported at this time.

bcmdiagnose and HP-UX

If you are using HP-UX and have difficulties passing the tftp portion of bcmdiagnose, you may need to modify the /etc/passwd file. Follow the instructions printed during bcmsetup. You may need to add the following line to the /etc/passwd file:

```
tftp::510:200:,,,:/tftpboot:/bin/false
```

See the HP-UX tftpd man page for more information.

bcmfdinteg

Read the following warning regarding the bcmfdinteg utility.

WARNING: *Do not use the bcmfdinteg utility. The bcmfdinteg utility is used internally by the bcminstall utility. The bcmfdinteg utility should not be used by itself, because by default it removes all files from the current directory.*

File Conversion Considerations

This section describes file conversion considerations for APPN, bridge static routes, DLSw, the PROfile service, and X.25 SVCs.

APPN

APPN file conversion is supported in software version 8.2 and later. Upgrading from software versions prior to 8.2 requires manual configuration.

High Performance Routing (HPR) is a new feature for the NETBuilder bridge/router after software version 8.3. If you use the Upgrade Management Utilities to convert your APPN data file from version 8.3 (or later) to 11.1, be sure to turn on HPR if HPR is desired using:

```
SETDefault !<port> -APPN PortDef = <DLC type> HPR=yes
```

Bridge Static Routes

A static bridge route configured with the off option does not convert properly. You must manually reconfigure this route.

DLSw

Initial Bandwidth for Peer is a new parameter for software version 8.3 and later. The default for version 11.0 is 8000. If you use the Upgrade Management Utilities to convert your DLSw data files from version 8.3 (or later) to 11.1, be sure to set the value of the parameter to the desired value using:

```
SETDefault <tunnel id> -Dlsw PEER = <IP address> <PrioMode> <8000 | other
  value>
```

PROfile Service

Software version 8.0 and later includes the PROfile Service. Many parameters that belong to the X25 Service were moved to this service. Because the mapping is not one-to-one, the upgrade utility does not convert all parameters. After upgrading from pre-8.0 version software, delete the X25 Service configuration file and reconfigure the parameters under the X25 Service.

The X25VCLIMIT, X25VCTimer, and X25QueueSize parameters, previously in the network layer protocols services (AppleTalk, DECnet, IP, IPX, and so on), were moved to the PROfile Service. If you configured any of these parameters, you need to reconfigure them.

X.25 SVCs

The default values of the X25 Service parameters have changed from versions of software prior to 8.0. To ensure that call initiation between mixed versions of X.25 software is successful, you must configure the Twoway SVCs parameter on both ends of the X.25 connection to the same value.

Upgrading From Release 8.3 or Earlier

If you are upgrading a NETBuilder from release 8.3 or earlier, you must disable user verification by specifying the -NA flag on bcmnbrus or Upgrade Link. For example:

```
bcmnbrus -NA
```

or

```
UpgradeLink -NA
```

Otherwise, an error dialog box is returned with the message “Could not verify user.”

If you use tftp, the “Verify Upgrade Services” step does not need the user or password to be verified, so those entries as well as the FTP Client User Name and Password, should be ignored.

Upgrade Link and Netscape Browser Scroll Bars

Netscape version 4.05 with AWT patch 1.1.5 has the Java support required by NETBuilder software version 11.1 Upgrade Link. Certain problems have been found with this Netscape patch release, such as sometimes the Netscape browser fails to add scroll bars with text fields. If you experience this or other problems, you may want to use a later version of Netscape when it becomes available.

Upgrade Link Window Resizing

Since NETBuilder software version 11.1 Upgrade Link cannot resize the browser window, you should maximize the browser window so that all of the Upgrade link dialog boxes will be fully visible without scrolling.

Notes and Cautions

This section describes notes, cautions, and other considerations to be aware of when using the NETBuilder bridge/router software. The topics are presented in alphabetical order.

APPN Connections to 3174 through Token Ring

When you connect to a 3174 on a token ring, you may need to enable transparent bridging on the bridge/router. The 3174 may send exchange identification (XID) as a non-source routed frame.

Asynch Tunnelling on Serial Ports

For best results, set the LineType parameter to Leased and set the SuperStack II NETBuilder bridge/router model 32x connector type for the universal port to RS-232. For the path to come up, the bridge/router must see a DTR or DSR control signal from the device. Or, if the device does not generate a control signal, a loopback connector should be used to supply the control signal.

ATM LAN Emulation Clients and Large 802.3 Frames

This release of LAN emulation software does not support large 802.3 frame encapsulation as specified in the LANE standard 1.0. When IP routing is used from FDDI to an emulated LAN, packets larger than 1500 are sent fragmented per IP fragmentation rules.

Automatic Line Detection

When set to the value of Auto, the -PATH LineType parameter first attempts to bring up the path as a leased line by raising the data terminal ready (DTR) signal. If the path comes up but a DTR-base dial modem is attached to the path, the modem does not hang up until brought down manually with the HangUp command. To avoid this situation, set the -PATH LineType parameter to Dialup.

Bandwidth-on-Demand Timer Precedence

Two PORT Service parameters are used to configure bandwidth-on-demand ports. The DialIdleTime parameter sets the time in seconds before all dialup lines in a port are disconnected if the port is not in use. The DialSamplPeriod parameter sets the time (in seconds) to sample before taking an action to bring additional paths up or down, based on traffic load for bandwidth-on-demand. The value specified for the DialIdleTime parameter takes precedence over the value specified for the DialSamplPeriod parameter.

Baud Rates for WAN Ports in DCE Mode

The following baud rates are supported in DCE mode (synchronous, internal clocking):

- 1200
- 1800
- 2400
- 3600
- 7200
- 9600
- 19 K
- 38 K
- 56 K
- 64 K
- 112 K
- 128 K
- 256 K
- 384 K
- 448 K
- 768 K
- 1344 K
- 1536 K
- 1580 K
- 2048 K

If you configure a baud rate that is different from those listed, the system will fall back to the nearest lower supported rate.

Supported Modems

Table 10 lists asynchronous and Table 11 list synchronous modems supported by 3Com.

Table 10 Supported Asynchronous Modems

Modems
Hayes (Accura 33.6)
Motorola (ModemSURFR 33,600)
3Com/USR (Courier, Sportster)
Multitech (MT1932ZDX)
3Com/USR (Impact IQ)

Table 11 Supported Synchronous Modem

Modem
3Com/USR (Courier)

BGP Configuration Files

Prior to software version 10.1, BGP configuration files were written to flash memory every 10 SETDs, ADDs, or Deletes. Beginning with version 10.1, BGP configurations are saved to flash memory immediately after each change, which practically eliminates the need for the SAVEbgp command.

3Com recommends that you pay special attention to bridge/router platforms running NETBuilder software version 10.1 and greater with pre-10.1 releases in the same network. Always enter the SAVEbgp command on any bridge/router running software previous to version 10.1 to make sure that all the BGP configurations are written to flash memory. Failure to do so may result in all the BGP configurations being lost after the next reboot.

Prior to NETBuilder software version 10.1, all IGP routes except OSPF External routes were imported into the BGP routing table by default. Beginning with NETBuilder software version 10.1, the "import" of IBP routes into BGP is controlled by the BGP IntPolDefault parameter.

BSC Cabling and Clocking

The data communication equipment (DCE) cable for SuperStack II bridge/routers should be 07-264-000-01 (rev. 1) to work in BSC internal clocking mode.

Boundary Routing and NetView Service Point

When configuring NetView Service Point in a Boundary Routing environment, note that the SSCP-PU session actually flows over LLC2 rather than DLSw, even though the -SNA PortDef parameter is defined as DLSw. As a result, the session does not show up as a DLSw circuit.

Compression Requirements

Compression must use the same configuration at both ends of the connection. If one side of a connection is configured as per-packet and the other is configured as history, the PPP link does not come up.

Configuring BSC and NCPs

When connecting a NETBuilder bridge/router to an Network Control Program (NCP) for a BSC configuration, be careful when disabling the 3780/2780 EP lines. If you try to pull the cable out, the NCP may go into a state that will require the NCP to be rebooted. Check with your IBM service representative for additional details.

CONNectUsage Parameter Default Change

The default value of the -SYS CONNectUsage parameter is High for NETBuilder bridge/routers with a DPE module. The default value of CONNectUsage for all other platforms is Low. This difference simplifies DLSw configurations.

When the DPE module is used in a non-DLSw configuration, a small amount of memory is allocated (226 K of approximately 12 MB). Non-DLSw configurations in very large networks running OSPF and BGP may require that the CONNectUsage parameter be changed to Low to recapture this 226 K of memory. For all other configurations, this additional small memory allocation should have no effect.

DLSw Circuit Balancing

Circuit balancing does not work properly if WAN links are set to different speeds. For circuit balancing to work properly, you must have WAN links of the same speed. If the WAN links are different speeds, for example, T1 and 64 K, the bridge/router with circuit balancing learns the route from the T1 link before learning the route from the 64 K link. All circuits are directed to the DLSw tunnel on the T1 link instead of being distributed on both 64 K and T1 DLSw tunnels. Only after alternate routes are in the circuit-balancing router cache will subsequent session establishment be balanced.

DLSw Prioritization

The FLush -SYS STATistics command does not flush DLSw priority statistics. You must use the FLush -DLSw PRioritySTATistics command.

Disaster Recovery on Ports Without Leased Lines

The Port Service DialControl parameter controls port attributes for a dial-up port in the event the bandwidth set for a leased line drops below what has been set as the normal bandwidth. Setting this parameter to DisasterRecovery for a port without leased lines prevents port idle out.

DTR Modems

DTR modems should not be configured as a dynamic path and a dial pool.

Firmware Configuration

To select BootP as your Address Discovery protocol, you must set all five IP address options to None.

Firmware Update

The bridge/router updates firmware as part of its software boot process. In some cases, some text is displayed during the firmware upgrade process, which appears similar to the following:

```
>>>>updating firmware boot bank A
>>>>famd_blk_erase: block addr less than 512K: 0x10000
>>>>famd_blk_erase: block addr less than 512K: 0x20000
>>>>Firmware boot bank update is complete.
```

These messages do not indicate a problem and can be ignored.

IBM-Related Services in Token Ring

IBM-related services such as DLSw and APPN are affected by parameter settings in the BRidge, SR, and LLC2 Services. Table 12 shows the required settings in source route (SR), source route transparent (SRT), and transparent bridging environments for each of the IBM-related services. When a NETBuilder bridge/router token-ring port is configured for both an IBM service such as DLSw and transparent bridging or SRT bridging, connectivity problems and frame copy errors can occur. For this reason, 3Com recommends configuring token ring ports for source route only when possible.

In Table 12, DLSw refers to data link switching, and LNM refers to LAN Net Manager. The settings are shown in abbreviated form. 3Com-recommended configurations are shaded and shown in **bold**.

Table 12 IBM-Related Feature Settings for Token Ring Ports

Services	**Port Configurat ion**	**Source Route Bridging (-SR SRB)**	**Transparen t Bridging (-BR TB)**	**Bridging (-BR CONT)**	**Route Discovery (-SR RD)**	**LLC2 CONTrol (-LLC2 CONT)**	**Frame Copy Errors**
Bridging only	**SR**	**SRB**	**NTB**	**B**	**NoLLC2**	**Disable**	**None**
Bridging only	SRT	SRB	TB	B	NoLLC2	Disable	Low # Possible
Bridging only	T	NSRB	TB	B	NoLLC2	Disable	Low # Possible
LNM	**SR**	**SRB**	**NTB**	**B**	**LLC2**	**Enable**	**None**
DLSw	**SR**	**SRB**	**NTB**	**NB | B**	**LLC2**	**Enable**	**None**
DLSw	SRT	SRB	TB	NB* | B*	LLC2	Enable	High # Possible
DLSw	T	NSRB	TB	NB* | B*	NoLLC2	Enable	High # Possible
APPN	**SR**	**SRB**	**NTB**	**NB | B**	**LLC2**	**Disable**	**None**
APPN	SRT	SRB	TB	NB | B	LLC2	Disable	None
APPN	T	NSRB	TB	NB | B	LLC2	Disable	None
Default Setting	SRT	SRB	TB	NB	NoLLC2	Disable	None

* 3Com recommends that you disable global bridging for this configuration. However, with global bridging disabled, the token-ring hardware does not filter unwanted transparent packets. The token-ring hardware copies each transparent packet for processing by the NETBuilder software. This can generate many frame copy errors (see Token Ring Frame Copy Errors below for more information.) If you are seeing many Frame Copy Errors, consider setting global bridging on, which allows the hardware to learn and filter unwanted transparent packets. Since DLSw cannot block bridging loops, you must insure that none exist. As an alternative, you can prevent the bridge from forwarding by entering the following command: SETDefault -BRidge CONTrol = NoForward. The NoForward parameter allows the hardware to filter unwanted transparent packets, allows DLSw to send and receive LLC2 SNA and NetBIOS packets, but prevents these and other packets from bridging.

The row in Table 12 labeled DLSw with port configuration SR represents DLSw in a source-route-only port configuration. The entries in this row expand to the following NETBuilder software configuration syntax:

```
SETDefault -BRidge CONTrol = Bridge | NoBridge
SETDefault !<port> -SR SrcRouBridge = SrcRouBridge
SETDefault !<port> -BRidge TransparentBridge = NoTransparentBridge
SETDefault !<port> -SR RingNumber = <number> (1–4095) | 0x<number> (1-FFF)
SETDefault !<port> -SR BridgeNumber = <number> (0-15) | 0x<number> (0-F)
SETDefault !<port> -SR RouteDiscovery = LLC2
SETDefault !<port> -LLC2 CONTrol = Enable
```

In this configuration, global bridging (-BRidge CONTrol) can be set to either Bridge or NoBridge. Transparent bridging is disabled on token ring ports, source routing and route discovery are configured, bridge numbers must be unique for each bridge/router on the same ring, and LLC2 is enabled on token ring ports.

Token Ring Frame Copy Errors

For transparent bridge or source route transparent configurations, token ring end systems may generate a small number of MAC frame copy error reports when the NETBuilder II bridge/router token ring interface is initializing or when the bridge/router ages out a MAC address from its bridge table.

For the bridge/router to learn the MAC addresses of transparent end systems on the token ring, it copies a packet with an unknown source address and sets the address-recognized (A) and frame-copied (C) bits in the Frame Status (FS) field. A problem occurs when the FS (A) and (C) bits have been set and the destination of the frame is an end system on the local ring. The destination end system expects the (A) and (C) bits to be zeros. When it receives a frame with these values already set, it reports an error. The end system counts these errors and accumulates them until the MAC layer Soft Error Report Timer period is reached; the default is two seconds. A MAC Report Error packet is then sent to the Ring Error Monitor (REM) Network Management entity.

A source route only configuration eliminates frame copy errors. Frame copy errors do not occur in source route only environments when the NETBuilder bridge/routers are configured properly. This is because the NETBuilder bridge/router hardware filters source-routed packets based on the route information field, not the MAC address. If the bridge/router is configured for source route only, it never copies frames destined for a station on the local ring. Frame copy errors can be eliminated by running in source-route-only mode.

Table 13 shows the features supported on the NETBuilder II and NETBuilder SuperStack II token ring bridge/routers.

Table 13 3Com Bridge/Routers and Supported Features

Platform	Source Route Transparent Bridging	Routing	Source Route Transparent Gateway	Source Routing
NETBuilder II	Yes	Yes	Yes	Yes
SuperStack II NETBuilder Token Ring	No	Yes	No	Yes

Frame Copy Errors under LAN Net Manager

Whenever LAN Net Manager is enabled, the token ring driver is set to N-way bridging mode, which means the bridge/router copies all frames that match the bridge number specified on the receiving port. If two NETBuilder bridge/routers are connected to the same ring with the same bridge number, frame copy errors will occur. To prevent this problem, do not configure two NETBuilder bridge/routers with the same bridge number on the same ring.

IPX Routing, Route Receive and Route Advertisement Policies

When you route IPX over a Frame Relay meshed topology and configure the SAP Route Receive and Route Advertisement policies on the Frame Relay port, these policies do not take effect until the SAP table is flushed.

LAN Network Manager with NETBuilder II Systems

If you have previously configured your LAN Network Manager to use the NETBuilder II system as a virtual ring, and you want to use it as a physical ring, you must set your virtual ring number back to None.

LLC2 Frames and PPP

LLC2 frames are not sent or received over PPP unless global bridging is enabled using the SETDefault -BRidge CONTrol = Enabled command. You must enable LLC2 on the port using:

```
SETDefault !<port> -LLC2 CONTrol = Enabled.
```

If bridging is enabled and you do not want bridging, either set the -BRidge CONTrol parameter to NoForward, or disable bridging on individual ports by setting the following command:

```
SETDefault -BRidge TransparentBridge = NoTransparentBridge
```

Remote Access Default Change

To increase network security, the default value for the NetAccess parameter in the SYS Service is set to NoRemote. This means that by default, no remote connection attempts will be accepted by the bridge/router. If you are accustomed to or want to use remote access, you must specifically set the value of the NetAccess parameter to Remote.

SuperStack II and OfficeConnect Boot Path

For SuperStack II and OfficeConnect NETBuilder bridge/routers, flash memory is the only storage media, which is not designated with a drive letter. When entering the boot path, do not specify a drive letter. Specifying a drive letter causes the boot load to fail.

V.25bis Modem Setup

If you are using a V.25bis modem with a NETBuilder boundary routing leaf node, and you configure the line type explicitly as dial rather than auto, be certain to also set the DialMode to V.25bis rather than use the default of DTR.

Web Link Documentation Path

When you set the DocumentPath parameter in the WebLink service to a local file, drive C for example (“`file:///c:`”), the Web Link assumes that access to the NETBuilder bridge/router takes place only from the computer to which the file is local. If Web Link is used from any other computer, the browser looks on its local “C” drive for the help pages. If the computer is a UNIX machine and these files are not present as expected, unpredictable browser behavior will result.

Zmodem Time Out

A Zmodem file transfer from a PC to a SuperStack II or OfficeConnect bridge/router can take a long time. To minimize the possibility that the PC Zmodem software will time out during the download, run the DEFRag command on the SuperStack II bridge/router before beginning the file transfer. The DEFRag command reclaims *dirty* space in flash memory. Dirty space is memory that has been written on and cannot be used again until it has been erased.

Known Problems

This section describes known problems in software version 11.1. Topics are in alphabetical order.

APPN CP-CP Sessions and SNA Boundary Routing

If you set up APPN routing in an SNA Boundary Routing configuration from a NETBuilder II bridge/router to a leaf node bridge/router, CP-CP sessions between the remote site PC and the NETBuilder II bridge/router are established before you can configure the Boundary Routing configuration on the NETBuilder II bridge/router. However, after you set the -BCN CONTrol parameter for IBM traffic and enable the -BCN Service, the NETBuilder II bridge/router no longer receives the CP-CP sessions. To work around this problem, first turn off BOOTP on the

NETBuilder II port at the central site. An alternative work around is to configure APPN with DLSw at the central site and to use the CEC's MAC address at the remote site.

APPN CP-CP Sessions on Parallel TGs

When parallel transmission groups (TGs) are configured between 3Com network nodes and both TGs support CP-CP sessions, a CP-CP session on one TG does not switch to the other TG if the user disables the port or path. This happens because both sides learn about the link failure at different times. The network node with the disabled port or path learns about the link failure right away and tries to bring CP-CP sessions up on the second TG. However, the second network node does not learn about the link failure until LLC2 times out; because it thinks the link is still up, the second network node does not allow CP-CP sessions to start on the second TG. After five attempts at bringing up CP-CP sessions on the second TG, the second TG will be flagged as not supporting CP-CP sessions, preventing CP-CP sessions from coming up on that second TG. To prevent this situation, manually stop the first TG by entering the SET -APPN LinkStaCONTrol <LinkName> Deactivate command before disabling the port/path. By doing this, both network nodes will learn that the link has gone down at the same time, and CP-CP session can be activated on the second TG.

ATM Connection Table

In a LAN Emulation environment with many LAN Emulation Servers (LESs), a performance drop may occur when the NETBuilder bridge/router is able to connect to the LAN Emulation Configuration Server (LECS), but many of the LESs are down or unreachable. Disabling the ETHATM virtual ports corresponding to the unreachable LESs will alleviate this situation.

Baud Rates for Async PPP

Although the maximum asynch speed supported by NETBuilder software version 11.1 is 38.4 bps, no error message is reported if the BAud parameter in the -PATH Service is configured to a larger value. A higher baud rate will be accepted and displayed, but the path will actually operate at 38.4 bps.

BGP MaxPeers Parameter Changes

When changing the value of the BGP Service MaxPeers parameter, make sure that BGP control is disabled and all peers are in the idle state before attempting to set the MaxPeers value. There is a period of time after BGP control has been disabled when the peers are flushing the routes in preparation for entering the idle state. Attempting to change the value of MaxPeers before the peers have entered the idle state may cause the router to crash.

Boot Cycle Continuous Loop

If the OfficeConnect bridge/router fails to complete the boot cycle and enters a boot cycle loop (for example, if the boot image is corrupted), press the ESC key to interrupt the boot cycle and enter monitor mode.

Change Configuration and Diagnostic Menu

The options on the Change Configuration and Diagnostic menu do not apply to the model 1x1 OfficeConnect bridge/router because ISDN ports are not present on this system.

Changing the Transfer Mode Parameter Default Value

The PATH service parameter TransferMode should not be changed from its default value of AUto. Other settings of this parameter are reserved for future extensions.

CHAP Rejection Message

When using only the SysCallerID to map calls on a dynamic path to a virtual port, you may see the following message just before the path comes up:

```
WARNING: CHAP on Port !<port> rejected; No AuthLocalUser configured!
```

The path will still come up and be bound to a virtual port based on the SysCallerID. This false warning appears only if no AuthLocalUser is defined on the port.

CPU Utilization Statistic

For the NETBuilder Remote Office bridge/routers, the CPU utilization statistic indicates a high percentage of utilization regardless of actual use. CPU utilization is displayed on the first line of the response to the SHow STATistics command. This incorrect display statistic will be fixed in a future release of the NETBuilder bridge/router software.

Deleting ATM Neighbors

Bridge ATM Neighbors must be deleted before the associated virtual ports can be deleted.

DHCP Address Pool Changes

The LAN IP Parameters screen in the QuickStep VPN component of Web Link for OfficeConnect NETBuilder model 145 bridge/routers with the VE package allows you to define the starting and ending IP addresses for the DHCP address pool, however, user changes entered here will not take effect. In order to define the starting and ending IP addresses for the DHCP address pool use the menus to select Configuration ⇒ Services ⇒ DHCP ⇒ Address Pool. Enter the address to define the range and select Configuration ⇒ Services ⇒ DHCP ⇒ Control and set the value for Port 1 to Enabled, AddressPool.

Displaying Configuration Profiles

The command SHow -PROFILE CONFiguration does not display specific details about individual profiles. To display detailed information, a profile ID must be included in the command. Use the following command syntax to display configuration details for the specified profile:

```
SHow !<profileID> -PROFILE CONFiguration.
```

Further, since the SHow -PROFILE CONFiguration command is invoked by the SHow -SYS ParameterValues command, the latter does not display specific details about individual profiles either.

Dynamic Paths

Dynamic paths might not be released back into the dial pool from the port if an incoming call arrives during a disconnect state. If the SHow -POrt PAths command indicates that a path from the dial pool is attached to a port but is no longer in use, it can be released by re-enabling the port.

Extensible Authentication Protocol

The Default Authentication Protocol parameter (DefaultAptCtl) in the PPP service does not allow you to set Extensible Authentication Protocol (EAP) as an option. Contact your 3Com Support Representative for a patch version of the software that allows you to set this parameter.

File System Error

Occasionally a false file system error message telling you to format and restore configuration files will appear on the console. These false errors appear when the background processing in the NETBuilder bridge/router is performing file operations and you attempt a write operation (such as a SETDefault command, DEFRag command, and FORMAT command). In these programmatic lockouts rather than media related error conditions, the flash file system will NOT need to be reformatted. Examining the results of the attempted command (such as SHow to examine the results of the attempted SETDefault) can indicate whether the file system error is a false indication or not.

Frame Relay Congestion Control

The current implementation of Frame Relay congestion control requires that you set the committed burst size (Bc) and the committed information rate (cir) to the same value so that the time interval (Tc) equals 1 second using the formula Tc=

<Bc>/<cir>. If Tc is not 1 second, the Frame Relay frames may be erroneously dropped due to the incorrect calculation of the throughput rate threshold.

History-Based Compression Negotiation Failure

If you are using history-based compression on a line with excessive errors and the negotiation attempts exceed the retry count, the device must be rebooted to clear the condition and reset the retry count.

IPX to Non-IPX Configuration Error

A mechanism does not exist to prevent adding a path from a non-IPX routing port to an IPX routing port. If this situation occurs, the router stops routing IPX traffic, even though the primary port has been up the whole time. To restart IPX routing, re-enable the port.

MBRI Ownership During Board Swapping

Port ownership and port/path naming inconsistencies can occur as MBRI boards are swapped in and out of a NETBuilder II bridge/router chassis. Replacing an MBRI board with a non-MBRI board in the same slot requires that the NETBuilder II bridge/router be rebooted. After the bridge/router is rebooted, there are no port/path naming problems.

Microsoft MPPE Patches and Updates

Microsoft has acknowledged performance problems with their original implementation of MPPE. You should use MSDUN1.2c or later for Windows 95 and apply Hot Fixes in article Q162230 for Windows NT. Contact your Microsoft service provider for additional information and updates when they become available.

MOSPF DLSw Multicast

In a typical DLSwV2 configuration, the MOSPF cloud encompasses the WAN ports and MOSPF control is enabled on the WAN ports and not on the LAN ports. At present, you must enable MOSPF on the LAN ports that connect the SNA/NetBIOS end systems as well; this problem will be fixed in a future release. Use:

```
SETDefault !<port> -MOSPF CONTrol = Enable
```

where !<port> is the LAN port(s) that connect the SNA/NetBIOS end systems.

Multiple Paths to BootP Server

Multiple paths to a BootP server may cause a BootP reply to fail. If a BootP reply is transmitted by a BootP server and not received by the router, flush the IP Routing table and re-enable BootP on the port waiting for the IP address. BootP must be re-enabled before route update are received.

NAT Service - Many to One Outbound Translation

NAT Many to One Outbound does not translate properly when multiple addresses, on LHS, are specified using comma (,) notation. But NAT Many to One Outbound translates properly when multiple addresses, on LHS, are specified in 10.3.1.0/24 notation.

NAT Service - TCP/UDP Port Mappings

When the NETBuilder bridge/router is configured to use TCP/UDP Port Mapping from port 23 (Telnet) to any other port number, the first command executed over the session will fail due to extra characters inserted into the command string. All subsequent commands issued for that session will succeed. If you encounter this problem, execute the command again.

PPP Configuration Display Errors

If you have no PPP ports configured on your bridge/router and you use the Show Configuration -PPP command, the resulting display appears without section headers. When there are correctly configured PPP ports, this problems is not observed.

PPTP Tunnel Security Validation

Authentication problems may occur when connecting a Windows 95 or NT client via a Total Control Hub to a NETBuilder II bridge/router where the Total Control Hub is setting up a PPTP tunnel to the bridge/router.

This problem is a combination of the security protocol between the client and the LS (in this case the Total Control Hub) and the time it takes to validate a Radius request on the Radius server. In addition, the setting of the DefaultAptCtl parameter needs to be considered because this determines which security protocol the NETBuilder bridge/router will use.

If the client and the LS negotiate to use PAP, the client will send PAP configure requests but at that time the LS is busy setting up the PPTP tunnel and will forward the PAP requests to the NETBuilder bridge/router. The bridge/router by default sends CHAP challenge to the client and normally the client responds immediately. Then the NETBuilder bridge/router sends a request to the Radius server for validation.

If there is another PAP request from the client to the bridge/router while the bridge/router is waiting for validation from the Radius server, the bridge/router will send a PAP NAK to the client and the session is terminated. If the CHAP success message is received before the next PAP message, the PAP message is discarded and the connection is established.

Solutions include disabling CHAP on the NETBuilder DAC or disabling PAP between the client and the LS.

This situation does not arise when the NETBuilder bridge/router is using internal security because it is fast enough to check the CHAP response before the next PAP message is generated.

RAS Ports with Manual Dial Configured Tunnels

Tunnels configured with Manual Dial, and terminated as RAS ports at the central site, will idle out inappropriately at the central site within the time specified by the DialIdleTimer when data is traversing the virtual port tunnel. You should configure the DialIdleTimer on the RAS defined port to be zero, or configure DOD tunnels.

Remote Office RAS Clients and Virtual Port Attributes

If you have a remote office dialing in to a central site router acting as a RAS server, and you wish to modify the port settings on the active virtual port connection, you must first hang up the active connection on your Remote Office bridge/router. Not doing so may result in a connection failure the next time you try to dial the virtual port to establish a tunnel to your central office site.

SPID Wizard Detection Errors

If the two routers are connected to a single NT-1, SPID Wizard cannot detect the correct switch type and corresponding SPIDs. To work around the problem, disconnect one of the routers from the NT-1 before running SPID Wizard. Reconnect the router after SPID Wizard completes the detection process.

STP AutoMode Does Not Select the Right Mode

When a NETBuilder II TI is connected over X.25 to a NETBuilder II bridge/router that has Ethernet or token ring, and the Ethernet is transparent bridging to other routers over X.25 and the token ring interface requires source route bridging to the NETBuilder II TI, STP does not select the right mode when the default value is AutoMode. Set the STP value to SRTMode.

Syntax Checking in PPP AuthRemoteUser Command

The ADD !<port> -PPP AuthRemoteUser command does not completely check for syntactical correctness. If the trailing quotation mark is omitted from or misplaced in the user's password, the system interprets the password as the string extending to the last non-white space character in the line or the quotation mark. For example:

```
ADD !v1 -PPP ARU (“user”, “password)”
ADD !v1 -PPP ARU (“user”, “password)
```

Both passwords are interpreted as “password)”. No error message is generated.

UI Response Time With Large SDLC configuration

When NETBuilder bridge/router is configured with many SDLC PUs, SETDefault commands may take a long time to complete. Using the Defrag command to streamline the flash that contains the configuration files can fix the problem.

VTAM Program Temporary Fixes

VTAM Program Temporary Fixes (PTFs) are required on a mainframe when APPN DLU services are used. Mainframe network management (NetView) services will not function for downstream physical units (PUs) if the PTFs are not installed. VTAM Version 4.2 requires PTF #UW20787. VTAM Version 4.3 requires PTF #UW20788.

Visible symptoms of this problem can be seen as a lack of network management data for PUs that are downstream of a NETBuilder II bridge/router using APPN DLU services. The NetView message “AAU251I AAUDRTIB 02 UNEXPECTED SENSE CODE X'1002' ENCOUNTERED FOR TARGET=pu_name” is printed in the log file when this problem occurs.

Web Link Boundary Router Remote LAN Type Display

If you use the Web Link application to display the Boundary Router Remote LAN Type of a Leaf Node, part of the display is truncated. Web Link returns the configured RemoteLanType and displays the following message:

```
Actual=To be determined
```

However, Web Link does not return the actual RemoteLanType. To find out the actual RemoteLanType, access the NETBuilder bridge/router through Telnet or through the console port and enter:

```
SHow !<port> -BoundaryCentralNode RemoteLanType
```

Web Link Firewall Service Support

The Firewall Service AddressList and UserDefService parameters are not configurable in the Web Link application. To configure these parameters, use LoadConfig or the NETBuilder bridge/router user interface.

Web Link Login Support

When you access the Web Link application for the first time, you are prompted to enter a username and password. This username and password remains valid on the NETBuilder bridge/router for two hours. Because most browers cache user login information, it is recommended that you log out of Web Link by selecting the “Logout” icon on the home page.

Web Link Reload Button

The "Stop Reload" button on Web Link statistics screens does not toggle and if clicked, further reloading of the statistics data is stopped. To start reloading again, revisit/reload the page.

Limitations

This section describes limitations of NETBuilder software version 11.1. Topics are in alphabetical order.

ACCM Not Configurable

The ACCM (Async Control Character Map) used for Async PPP cannot be configured. During LCP negotiation, the NETBuilder bridge/router always proposes an ACCM of all zeros and agrees to whatever the peer negotiates.

APPN

In software version 11.1, APPN does not support SMDS.

APPN DLUr Connections to 3174 Systems

When you configure an APPN dependent LU requestor (DLUr) connection from a NETBuilder II bridge/router to a 3174 cluster controller, the NETBuilder II network node and the 3174 must be on the same ring. In this configuration, the NETBuilder II token ring port must be set to transparent bridging only.

ATM Emulated LANs

The NETBuilder II bridge/router software supports a system maximum of 32 ATM emulated LANs.

Auto Start-up Does Not Include Async

Automatic detection of the line type (LineType=Auto) and link protocol (OWNer=Auto) do not include recognition of Async PPP and AT dial. For Async PPP and AT dial (which must be used together), the following parameters must be explicitly configured:

```
-PATH LineType=Dialup
-PATH DialMode=ATdial
-PATH ExDevType=Async
-PORT OWNer=PPP
```

The PATH service parameter TransferMode should not be changed from its default value of AUto. Other settings of this parameter are reserved for future extensions.

BSC and Leased Lines

The BSC pass-through feature is limited to leased lines and cannot use dialup links.

DLSw and IBM Boundary Routing in Large Networks

The following considerations are related to DLSw in large networks.

Leaf Node Sessions Support

When a leaf node has more than 50 end stations, use the following tuning parameters:

```
SETDefault !<port> -LLC2 TransmitWindow = 1
SETDefault !<port> -LLC2 RetryCount = 20
SETDefault !<port> -LLC2 TImerReply = 10000
```

Use these parameters for the leaf node and central node WAN ports.

Number of DLSw Circuits

The -SYS CONNectionUsage parameter controls the maximum number of DLSw circuits. The default value of the CONNectionUsage parameter is High for NETBuilder bridge/router with a DPE module and for the boundary router peripheral node, but the default value is low for all other NETBuilder bridge/router platforms. Change this value using:

```
SETDefault -SYS CONNectionUsage = Low | Medium | High
```

You must reboot the bridge/router before this change takes effect. Table 14 shows the maximum number of circuits possible with the different CONNectionUsage parameter settings. The practical limit may be lower and depends on the traffic load, CPU, and memory usage by other services.

Table 14 DLSw Circuit Maximums with CONNectionUsage Parameter Settings

	Maximum Number of DLSw Circuits		
System	**Low**	**Medium**	**High**
OfficeConnect and SuperStack II NETBuilder bridge/routers	190	390	790
Boundary router peripheral node*	n/a	n/a	790†
NETBuilder II bridge/router			
DPE modules	390	790	7990

* The CONNectionUsage parameter is set to High by the Boundary Router Peripheral node software; it cannot be changes.

† The IBM Boundary Router peripheral node uses two LLC2 circuits to support one LLC2 end system. Therefore, the maximum number of LLC2 end systems supported by an IBM Boundary Router peripheral node is 395.

Number of TCP Connections

3Com LLC2 tunneling uses one TCP connection for each LLC2 session. DLSw scales to large networks better than LLC2 tunneling because it multiplexes all LLC2 sessions over one TCP connection per tunnel. Each Telnet session also uses one TCP connection. Table 15 shows the maximum number of TCP connections possible with the different CONNectionUsage parameter settings. The practical limit may be lower and depends on the traffic load, CPU, and memory usage by other services.

Table 15 TCP Circuit Maximums with CONNectionUsage Parameter Settings

	Maximum Number of TCP Circuits		
System	**Low**	**Medium**	**High**
OfficeConnect and SuperStack II NETBuilder bridge/routers	32	256	512
Boundary router peripheral node*	n/a	n/a	790
NETBuilder II bridge/router			
DPE module	32	512	2048

* The CONNectionUsage parameter is set to High by the Boundary Router peripheral node software; it cannot be changed.

Front-End Processor/Frame Relay Access for LLC2 Traffic

The maximum number of FradMap entries that may be defined for each Frame Relay port is 50.

History Compression Not Allowed With Async PPP

A port using Async PPP (AT dial) cannot be configured for history compression. The user interface will not prevent you from configuring the port for history compression, however, if history compression is selected the path will not come up.

HPR and ISR Configurations

High Performance Routing (HPR) is enabled by default. Therefore, if you are configuring APPN Intermediate Session Routing (ISR), you must disable HPR on both the PortDef and the AdjLinkSta parameters by setting HPR = No.

IBM Boundary Routing Topology Disaster Recovery

In an IBM Boundary Routing topology that uses disaster recovery through PPP (when two paths are mapped to one port), a disruption to existing SNA and

NetBIOS sessions occurs if the primary link fails and the redundant link is activated. If this happens, end users need to log on and initiate another session.

Maximum BSC Line Speed

For V.35 and RS-232 links, the maximum baud rate supported for BSC traffic is 38.4. If the baud rate is higher, BSC traffic suffers errors and retransmissions.

Multilink PPP Configurations

Multilink PPP (MLP) is supported for multiple WAN links connected to the same port running PPP.

When configuring MLP:

- For maximum performance on a NETBuilder II bridge/router, 3Com recommends that similar hardware interface types be configured for each MLP bundle. For instance, bundle HSS modules with HSS modules, and bundle HSS 3-port module links with HSS 3-port module links.
- For the best performance, use MLP on interfaces with matched line speeds. Avoid mismatched baud rates of ratios greater than 10 to 1 for bundled links.
- If your baud rate ratios on two links are greater than 4 to 1, the MLP feature automatically turns off fragmentation. For baud ratios of less than 4 to 1, you may choose to turn off fragmentation for performance considerations. Turn off fragmentation using the MlpCONTrol parameter in the PPP Service.
- MLP does not support the HSSI module.
- Before you re-enable a port running MLP, disable the port and allow the remote port to go down. This action prevents loss of packet sequence numbers synchronization, which causes packets to be dropped when the MLP port is enabled.

Multiport MBRI Module SNMP Management

The Multiport MBRI module cannot be configured using SNMP.

NAT Proxy ARP

NAT does not support proxy ARP. If the NETBuilder bridge/router is configured for NAT private address space, you should use a different network address on the RHS other than the directly connected network IP address. Additionally, you should specify a static route to that address on the remote host.

RouteDiscovery

If RouteDiscovery is enabled on all protocols (-SR RouteDiscovery = All), in the maximum packet forwarding rate drops significantly during route discovery. 3Com recommends that you enable RouteDiscovery only for the protocols you use. Increasing the value of the -SR HoldTime parameter minimizes the drop in forwarding rate for these protocols.

SDHLC Half-Duplex Mode

SDHLC does not support physical half-duplex mode.

SDLC

SDLC requires the following:

- XID spoofing must be turned on if the IBM Communication Manager is used for 3270 communications and is defined as a PU type 2.0. Use the following syntax:

```
SETDefault !<PU name> -SDLC CUXId = <value> (8 Hexadecimal digits)
SETDefault !<PU name> -SDLC CUXidDefined = Yes
```

- SDLC end-to-end through local switching (conversion to a single LLC2 LAN connection between two NETBuilder bridge/routers) requires different virtual ring numbers in the LLC2 Service.

SDLC Adjacent Link Stations for APPN

When you configure SDLC adjacent link stations for APPN, if an active link becomes inactive and you change the port definition using the PortDef parameter, the link remains inactive. If you try to reactivate the link using the SET -APPN LinkStaCONTrol command, the link reactivates within 30 seconds. To activate the link immediately, you must enable the APPN port using the SET -APPN PortControl = Enable command.

Source Route Transparent Bridging Gateway (SRTG) Interoperability

The NETBuilder II bridge/router cannot interoperate with Cisco or IBM routers if the NETBuilder bridge/router is configured using Source Route Transparent Gateway (SRTG) with Source Route bridging on the token ring LAN port and Transparent Bridging on the PPP or Frame Relay WAN ports. In this configuration, the NETBuilder II bridge/router is sending using PPP bridge encapsulation 802.5 token ring format, while the IBM 6611 and the Cisco 400 router are using PPP bridge encapsulation 802.3 Ethernet format.

SDLC Ports and NetView Service Point

An SDLC port defined for NetView Service Point cannot be used for SDLC-to-LLC2.

Source-Route Transparent Gateway

The source-route transparent gateway is not currently supported on ATM LAN emulation ports.

Token Ring+ Modules

The maximum physical frame size that can be forwarded by the Token Ring+ modules with NETBuilder bridge/router software is 4,500 bytes. This software limitation affects routing, source route bridging, and transparent bridging.

Token Ring Auto Start-up

The Token Ring and Token Ring+ modules may enter the ring at the wrong speed with certain MAU or station configurations. You can manually configure the -PATH BAud value to 16,000 or 4,000 to avoid this situation.

VRRP Configuration

VRRP cannot coexist with DECnet, LAA, OSI, or IPv6.

USING NETBUILDER FAMILY SOFTWARE UPDATE PAGES

This section includes update pages with changes and additions to *Using NETBuilder Family Software*, software version 11.1.

Place the update pages at the front of each specified chapter.

17 CONFIGURING IPSEC

11.1 Release Notes, *Using NETBuilder Family Software Version 11.0*

Replace Chapter 17 with this chapter.

This chapter describes how to configure the IP Security Protocol (IPsec) on your IP router. IPsec provides security at the network layer. Because IPsec is integrated into IP itself, IPsec adds security to any link, regardless of the application used.

Before configuring IPsec, you should configure a tunneling protocol like PPTP. See Chapter 12 for more information about PPTP.

It is recommended that IPSEC control or the PORT service control be disabled while configuring policies and enabled only after all IPSEC policy and key set configuration has been completed.

For conceptual information, see "How IPsec Works" on page 56.

Configuring IPsec

The procedures in this section describe how to configure IPsec.

Creating Policies

An IPsec policy consists of an action, the packet types that require the action, and the source and destination addresses between which the action occurs. The following three actions are supported:

- Action AhXport provides data integrity and authentication.
- Action EspXport provides data confidentiality through encryption.
- Action AhEspXport provides data integrity and authentication and data confidentiality through encryption.

To configure a security policy, use:

```
ADD !<portlist> -IPSEC manualPOLicy <policy_name> <action> <filters>
                            <src_ipaddr/mask>
                            (<dst_ipaddr/mask> | DYNamic)
                            [<encrypt_algorithms] [<auth_algorithms>]

       <action>   : AhEspXport | AhXport | EspXport

       <filters>  :list of the following values separated by commas:
                   GRE, ICMP, OSPF,
                   TCP [(<src_port>,<dst_port>)...up to 16 pairs],
                   UDP [(<src_port>, <dst_port>)...up to 16 pairs]

       <encrypt_algorithm> : 3DES2key | DES | RC5
```

```
<auth_algorithm> : MD5 | SHA

<portlist >: 1-65535 | * | Archie | DNS | Finger | FTP | FTPData |
             Gopher | HTTP | NFS | NNTP | NTP | POP2 | POP3 |
             PortMap | RIP | SMTP | SNMP | SNMPTrap | Syslog |
             Telnet | TFTP | WAIS
```

The default for encrypt_algorithms is DES. The default for auth_algorithms is MD5.

Creating an Encryption Policy

To create an encryption policy for Telnet traffic using the default encryption algorithm DesCbc from router 1 with IP address 170.0.0.1 to router 2 with IP address 180.0.0.1, follow these steps:

1 On bridge/router 1, enter:

```
ADD !1 -IPSEC POLicy esp_pol EspXport tcp(*, Telnet) 170.0.0.1 180.0.0.1
```

2 On bridge/router, 2 enter:

```
ADD !1 -IPSEC POLicy esp_pol EspXport tcp(Telnet,*) 180.0.0.1 170.0.0.1
```

To configure an encryption policy for Telnet traffic using the 3DES2key encryption algorithm between router 1 with IP address 170.0.0.1 and router 2 with IP address 180.0.0.1, follow these steps:

1 On bridge/router 1, enter:

```
ADD !1 -IPSEC POLicy esp_pol EspXport tcp(Telnet,*) (*,Telnet) 170.0.0.1
180.0.0.1 3DES2key
```

2 On bridge/router, 2 enter:

```
ADD !1 -IPSEC POLicy esp_pol EspXport tcp(Telnet,*) (*,Telnet) 180.0.0.1
170.0.0.1 3DES2key
```

Creating a Security Policy

To create a security policy to provide data confidentiality and data integrity for PPTP tunnel traffic between router 1 and router 2, follow these steps:

1 On bridge/router 1 enter:

```
ADD !1 -IPSEC POLicy ahesp_pol AhEspXport tcp, gre 170.0.0.1 180.0.0.1
```

2 On bridge/router 2, enter:

```
ADD !1 -IPSEC POLicy ahesp_pol AhEspXport tcp, gre 180.0.0.1 170.0.0.1
```

Creating Key Sets

To create a key set, use:

```
ADD -IPSEC KeySet <key_set_name> [EncryptKey ("<encrypt_key>" |
   "%<encrypt_key>")] [AuthKey ("<auth_key>" | "%<auth_key>")]
```

The encrypt_key and auth_key must match the values on the peer system at the other end of the security association.

<key_set_name> is a name you assign to the key set you are adding.

<encrypt_key> and <auth_key> can be 1 to 128 bytes entered as either ASCII text strings or as a series of hexadecimal digits. See "Configuring Manual Key Information" next for more information about key set usage.

To delete a key set, use:

```
DELete -IPSEC KeySet [<key_set_name> | ALL]
```

For example, to create a new encryption key set, enter:

```
ADD IPSEC KeySet esp_key EncryptKey "hello124"
```

To create a key set for both encryption and authentication, enter:

```
ADD IPSEC KeySet ahesp_key EncryptKey "hello124" AuthKey "world236"
```

Configuring Manual Key Information

The ManualKeyInfo parameter binds manual keying information to an IPsec policy. Only one ManualKeyInfo command can be applied to each policy. To configure manual key information, use:

```
SETDefault !<portlist> -IPSEC ManualKeyInfo = <policy_name>
   (<key_set_name> | NONE) [SpiEsp <spi_in> <spi_out>] [SpiAh <spi_in>
   <spi_out>]
```

A Security Parameters Index (SPI) value is used in conjunction with the destination address to identify a particular security association which represents a set of agreements between senders and receivers on a key, on an encryption or authentication algorithm, and on SPI numbers.

<spi_in> is a number in the range 256 to 2000. All spi_in values must be unique on a system. An SPI number can be assigned only ONCE to a policy. The same number cannot be used by any other policy on the same system. spi_in must match the spi_out value specified at the peer system at the other end of the security association.

<spi_out> is a number in the range 256 to 2147483647. spi_out must match the spi_in value specified at the peer system at the other end of the security association.

A key is specified using the ADD -IPSEC KeySet command. It is later bound to an IPSEC manualPolicy when a SETDefault -IPSEC ManualKeyInfo command is entered. The keyset and policy must be entered before binding can take place.

When the key is entered, no particular length restriction is applied. Keys can be entered as either ASCII text or hex values in the range of 1 to 128 bytes.

When a key is bound, certain length restriction are applied. The required key length depends on the NETBuilder software package used. The xS packages (S=strong encryption) allow key lengths of up to 128 bits for encryption, and the xE packages allow up to 56-bit keys. When you bind the key to the policy during configuration, if the entered key is too long for the package in use, the key is truncated and a warning message is generated.

All packages reject keys that are less than 5 bytes long and generate error messages. The xE packages truncate long keys to 7 or 8 bytes, and the xS packages truncate long keys to 16 bytes, with appropriate warning messages.

When you specify a key that is too short, the policy binding operation generates an error message informing you of the key length discrepancy and the key is rejected. If this should occur you will need to delete the specified key and reenter a key of the appropriate length.

During boot, any previously configured policies and keys are bound together. The various length restrictions are applied during this binding, so that you cannot use keys that are longer than the package supports. At boot-time, binding accepts DES keys that are shorter than 8 bytes and the system generates a warning rather than an error.

For compatibility with previous software versions that did not enforce key lengths, it is possible to enter a DES key as an 8-byte hex value with the appropriate number of null characters at the end. For example, a DES key of abcd should now be entered:

```
%6162636400000000
```

To change the manual keying information, you must first delete the information using NONE as the key set name, then add the new information using SETDefault.

For example, to create a security association and bind a key set to a corresponding encryption policy, enter:

```
SETDefault !1 -IPSEC ManualKeyInfo = esp_pol esp_key SpiEsp 500 501
```

To create a security association of an encryption and authentication policy, enter:

```
SETDefault !1 -IPSEC ManualKeyInfo = ahesp_pol ahesp_key SpiEsp 600 601
SpiAh 700 701
```

When keys are displayed using the SHow -IPSEC Keyset command, the MD5 hash of the key is displayed rather than the key itself. This allows you to compare keys for equality without exposing the actual key value. The length of the key is also displayed, since the hash is always a 32-digit hex value.

Enabling IPsec

Enable IPsec policy checking on the port using:

```
SETDefault !<portlist> -IPSEC CONTrol = Enable
```

You should only enable IPsec policy checking on ports that need IPsec protection. Enabling IPsec policy checking can decrease the performance of your bridge/router.

For example, to enable IPSEC on port 1, enter:

```
SETDefault !1 -IPSEC CONTrol = Enable
```

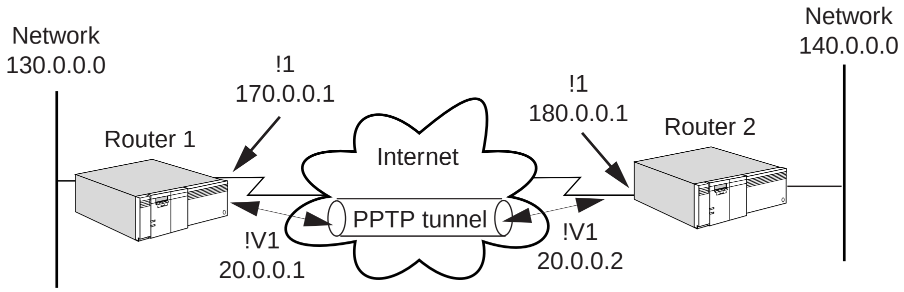
To disable IPSEC on port 1, enter:

```
SETDefault !1 -IPSEC CONTrol = Disable
```

Setting up a VPN PPTP Tunnel

The procedure that follows shows how to set up a VPN PPTP tunnel between router 1 (170.0.0.1) and router 2 (180.0.0.1) with an IPSEC policy providing data confidentiality and data integrity.

Figure 1 VPN PPTP Tunnel



On router 1, set up the tunnel from 170.0.0.1 to 180.0.0.1 by following these steps.

1 Set the system name to "router1" by entering:

```
SETDefault scid = "router1"
```

2 Create a virtual port to accept connection requests from only router 2 by entering:

```
ADD !v1 -POrt VirtualPort scid "router2"
```

3 Assign an IP address to the tunnel virtual port by entering:

```
SETDefault !v1 -IP NETaddr =20.0.0.1 255.255.0.0
```

4 Create a route between the two tunnel endpoints by entering:

```
ADD -IP ROUte 180.0.0.1 !1 1
```

5 Create a router manually to route traffic over a PPTP tunnel by entering the following or turn on routing protocols on the corresponding virtual port:

```
ADD -IP ROUte 140.0.0.0 255.255.0.0 !v1 1
```

6 Assign peer's dial number to PPTP tunnel dial number list by entering:

```
ADD !v1 -POrt DialNoList"@170.0.0.1" Type=pptp
```

7 Optionally, set the dial idle time-out to zero to keep the tunnel from timing out by entering:

```
SETDefault !v1 -POrt DialIdleTime = 0
```

8 Enable Layer 2 Tunnelling by entering:

```
SETDefault -L2Tunnel CONTrol=Enable
```

9 Configure an IPSEC policy/security association by entering:

```
ADD !1 -IPSEC manualPOLicy pptp_ahesp AhEspXport tcp,gre 170.0.0.1
180.0.0.1

ADD -IPSEC KeySet pptp_key EncryptKey "Hello572" AuthKey "world329"

SETDefault !1 -IPSEC ManualKeyInfo=pptp_ahesp pptp_key SpiEsp 500 501
SpiAh 600 601

SETDefault !1 -IPSEC CONTrol=Enable
```

On router 2, setup the PPTP tunnel from 170.0.0.1 to 180.0.0.1 by following these steps:

1 Set the system name of router 2 to "router2" by entering:

```
SETDefault scid="router2"
```

2 Create a virtual port that will accept connection requests from only router1 by entering:

```
ADD !v1 -POrt VirtualPort scid"router1"
```

3 Assign an IP address to the tunnel virtual port by entering:

```
SETDefault !v1 -IP NETaddr=20.0.0.2 255.255.0.0
```

4 Create a route between two tunnel endpoints by entering:

```
ADD -IP ROUte 170.0.0.1 !1 1
```

5 Add a static route to route traffic over a PPTP tunnel by entering the following or turn on routing protocols on the corresponding virtual port:

```
ADD -IP ROUte 130.0.0.0 255.255.0.0 !v1 1
```

6 Assign the peer dial number to the PPTP tunnel dial number list by entering:

```
ADD !v1 -POrt DialNoList "@170.0.0.1" Type=pptp
```

7 Optionally set dial idle time-out to zero to keep tunnel from timing out by entering:

```
SETDefault !v1 -POrt DialIdleTime=0
```

8 Enable Layer 2 Tunnelling (PPTP) by entering:

```
SETDefault -L2Tunnel CONTrol=Enable
```

9 Configure an IPSEC policy/security association by entering:

```
ADD !1 -IPSEC manualPOLicy pptp_ahesp AhEspXport tcp,gre 170.0.0.1
180.0.0.1

ADD -IPSEC keyset pptp_key EncryptKey "hello124" AuthKey "world678"

SETDefault !1 -IPSEC ManualKeyInfo=pptp_ahesp pptp_key SpiEsp 501 500
SpiAh 601 600

SETDefault !1 -IPSEC CONTrol=Enable
```

Establishing the Dialup Tunnel

After all the configuration is completed at both ends of the connection, you can dial the PPTP tunnel from either end by entering:

```
DIal !v1
```

How IPsec Works

IPsec integrates security directly into IP. IPsec provides three main areas of security: authentication, which validates the communicating parties; integrity, which makes sure the data has not been altered; and privacy, which ensures the data cannot be intercepted and viewed.

IPsec secures the underlying network layer. That way, an IPsec link is secure regardless of the application.

IPsec works with the existing Internet infrastructure using encapsulation. It secures a packet of data by encrypting it before sending it over the Internet. On the receiving end, an IPsec-compliant device decrypts the data.

On each end of the link (systems at both ends comprise a security association), IPsec is configured with the same key set and manual key information. The key set allows each system in the security association to encrypt, decrypt, or authenticate each other's data.

The security protection can be selectively applied to various types of data traffic based on protocols, IP addresses, network addresses, applications (via TCP/UDP port addresses), and network interfaces. System-originated IP traffic (Telnet, OSPF, RIP for example) can be protected by IPSEC directly. SNA traffic can be protected by IPSEC through the DLSw tunnel. Other multiprotocol traffic (IPX, AppleTalk, DECnet for example) and forwarded IP traffic are protected by IPSEC through the PPTP tunnel. See Chapter 12 for more information about PPTP/L2TP tunneling.

Policies

IPsec policies allow you to protect various types of traffic based on protocols, IP addresses, network addresses, network interfaces, and applications (via port addresses).

Encapsulation Security Payload (ESP)

ESP is used to provide data confidentiality via encryption using the DES-CBC crypto algorithm. For outbound traffic, it encrypts the IP payload and inserts an ESP header between the IP header and the payload. For inbound traffic, it decrypts the IP payload and removes the ESP header.

DES and RC5 encryption algorithms are supported in the xE packages. 3DES2key is supported only in xS packages.

DES is the Cipher Block Chaining (CBC) mode of the US Data Encryption Standard (DES). It requires an 8-byte key and operates on an 8-byte data block where the output of each block is fed into the next block to avoid repeating the same cipher output for those blocks with the same cleartext data.

RC5 is a cipher block chain encryption algorithm that may provide slightly faster performance than DES. RC5 requires a minimum of 5 bytes for the encryption key. The key may be as long as 7 bytes in xE packages, and as long as 16 bytes in xS packages.

3DES2key is a three-stage block cipher encryption algorithm that uses an encrypt-decrypt-encrypt sequence for greater security than standard DES encryption. The operation is similar to the 3DES encryption algorithm except that instead of using unique keying information for each stage, 3DES2key uses the same keying information for both encryption stages. 3DES2key requires a 16-byte encryption key to be entered. It uses the first 8 bytes for both encryption phases, and the second 8 bytes for the decrypt phase.

Key lengths are enforced when they are entered. Warning or error messages inform you when the entered key does not meet the requirements.

Entered keys longer than the supported maximum length for the chosen crypto algorithm and the package are truncated as necessary.

DES-CBC CANNOT be exported without a legal export license. See the release notes for your software for export restrictions.

ESP can be applied alone or with authentication headers.

Authentication Header (AH)

AH is used to provide data integrity and data origin authentication and to provide protection against replays using the HMAC-MD5 or HMAC-SHA1 crypto algorithm. For outbound traffic, AH computes ICV (integrity checksum value) and inserts an authentication header between the IP header and the higher layer protocol header. For inbound traffic, AH verifies the ICV and removes the AH. AH can be applied alone or with ESP.

Both HMAC-MD5 and HMAC-SHA1 are standards-based hash algorithms. In general, HMAC-SHA1 requires more computation and is considered to be more secure but slower.

REFERENCE FOR NETBUILDER *FAMILY* SOFTWARE UPDATE PAGES

This section includes update pages with changes and additions to *Reference for NETBuilder Family Software* Version 11.1.

Place the update pages at the front of each specified chapter.

33

IPSEC SERVICE PARAMETERS

11.1 Release Notes, *Reference for NETBuilder Family Software*

Replace Chapter 33 with this chapter.

This chapter describes the IPSEC Service parameters. Table 1 lists the IPSEC Service parameters and commands.

Table 1 IPSEC Service Parameters and Commands

Parameters	Commands
CONFiguration	SHow
CONTrol	SETDefault, SHow
KeyEncryptionKey	SETDefault, SHow
KeySet	ADD, DELete, SHow
ManualKeyInfo	ADD, DELete, SHow
manualPOLicy	ADD, DELete, SHow

CONFiguration

Syntax

```
SHow -IPSEC CONFiguration
```

Default No default

Description The CONFiguration parameter displays all the currently configured IPSEC policies and key sets.

CONTrol

Syntax

```
SETDefault [!<portlist>] -IPSEC CONTrol = [Enable | Disable]
SHow [!<portlist>] -IPSEC CONTrol
```

Default Disable

Description The CONTrol parameter enables or disables IPSEC policy checking on a list of ports. You should only enable IPSEC policy checking on ports that need IPSEC protection. Enabling IPSEC policy checking can decrease the performance of your bridge/router.

KeyEncryptionKey

Syntax

```
SETDefault -IPSEC KeyEncryptionKey =  "<encrypt_key>|%<encrypt_key>"
SHow -IPSEC KeyEncryptionKey
```

Default No Default

Description All keysets are encrypted and protected with the current KeyEncryptionKey and stored in the IPSEC configuration file. The value of the KeyEncryptionKey parameter which is stored in the EEPROM, can be updated by root, but is not readable by anyone. An embedded key is used to protect the keysets if KeyEncryptionKey is never set. The Show command shows only the encoded value of KeyEncryptionKey for comparison purposes only.

KeySet

Syntax

```
ADD -IPSEC KeySet <key_set_name> [EncryptKey (“<encrypt_key>” |
  “%<encrypt_key”>)] [AuthKey (“<auth_key>” | “%<auth_key>”)]
DELete -IPSEC KeySet [<key_set_name> | ALL]
SHow -IPSEC KeySet [<key_set_name>]
```

Description The KeySet parameter adds manual encryption and authentication keys. Key values can be entered as either ASCII text strings or as a series of hexadecimal digits. The text or hex key values are converted to actual key values for each supported encryption and authentication algorithm.

When key sets are displayed using the SHow command, encoded values for the keys, instead of the actual values, are displayed for added security. The encoded key value is unique for each key value and can be used to verify that keys match between different routers.

The encrypt_key and auth_key must match the values on the peer system at the other end of the security association.

When the length of the EncryptKey or AuthKey key value entered is less than the actual key size used by the selected encryption or authentication algorithm, the key value is padded with zeroes to the appropriate key size. For example, if a 6-octet (character) EncryptKey is entered for DES-CBC encryption, two zero octets are appended to the key value entered to create the 8-octet key. When the length of EncryptKey or AuthKey key value entered is larger than the actual key size used by the selected encryption or authentication algorithm, the key value is truncated to the appropriate key size. For example, if a 10-octet (character) EncryptKey is entered for DES-CBC encryption, only the first 8-octets of the value entered are used.

When the key is entered, no particular length restriction is applied. Keys can be entered as either ASCII text or hex values in the range of 1 to 128 bytes.

When a key is bound, certain length restriction are applied. The required key length depends on the NETBuilder software package used. The xS packages (S=strong encryption) allow key lengths of up to 128 bits for encryption, and the xE packages allow up to 56-bit keys. When you bind the key to the policy during configuration, if the entered key is too long for the package in use, the key is truncated and a warning message is generated.

All packages reject keys that are less than 5 bytes long and generate error messages. The xE packages truncate long keys to 7 or 8 bytes, and the xS packages truncate long keys to 16 bytes, with appropriate warning messages.

When you specify a key that is too short, the policy binding operation generates an error message informing you of the key length discrepancy and the key is rejected. If this should occur you will need to delete the specified key and reenter a key of the appropriate length.

Values

key_set_name

A name you assign to the key set you are adding. <key_set_name> can be from 1 to 128 characters long but cannot be none, NONE, all or ALL.

encrypt_key,
auth_key

An ASCII text string or a string of hexadecimal numbers.

ManualKeyInfo

Syntax

```
SETDefault !<portlist> -IPSEC ManualKeyInfo <policy_name> (<key_set_name>
 | NONE) [SpiEsp <spi_in> <spi_out>] [SpiAh <spi_in> <spi_out>]
SHow !<portlist> -IPSEC ManualKeyInfo [<policy_name>]
```

Description

The ManualKeyInfo parameter adds manual keying information to an IPSEC policy and key set. Only one ManualKeyInfo command can be applied to each policy. To change the manual keying information after it has been applied to a policy, you must first delete the information using the NONE as the key set name, then add the new information using ADD.

The ManualKeyInfo parameter creates one or two pairs of security associations between the local router and the destination router.

Values

policy_name

A name you assigned to a policy you added using the POLicy parameter.

key_set_name |
NONE

A name you assigned to a key set you added using the KeySet parameter. If you specify NONE, all manual key information is erased.

spi_in

A number in the range 256 to 2000. All spi_in values must be unique on a system. spi_in must match the spi_out value specified at the peer system at the other end of the security association.

spi_out

A number in the range 256 to 2147483647. spi_out must match the spi_in value specified at the peer system at the other end of the security association.

manualPOLicy

Syntax

```
ADD !<portlist> -IPSEC manualPOLicy <policy_name> <action> <filters>
                            <src_ipaddr/mask>
                            (<dst_ipaddr/mask> | DYNamic)
                            [<encrypt_algorithms] [<auth_algorithms>]

       <action>   : AhEspXport | AhXport | EspXport

       <filters>  :list of the following values separated by commas:
                   GRE, ICMP, OSPF,
                   TCP [(<src_port>,<dst_port>)...up to 16 pairs],
                UDP [(<src_port>, <dst_port>)...up to 16 pairs]

        <encrypt_algorithm> : 3DES2key | DES | RC5

        <auth_algorithm> : MD5 | SHA

        <portlist >: 1-65535 | * | Archie | DNS | Finger | FTP | FTPData |
                     Gopher | HTTP | NFS | NNTP | NTP | POP2 | POP3 |
                     PortMap | RIP | SMTP | SNMP | SNMPTrap | Syslog |
                     Telnet | TFTP | WAIS

DELete !<portlist> -IPSEC POLicy (<policy_name> | ALL)
SHow !<portlist> -IPSEC POLicy [<policy_name>]
```

Default

- encrypt_algorithms = DES
- auth_algorithms = MD5

Description

The manualPOLicy parameter adds IPSEC policies to a port. You must enable the IPSEC CONTrol parameter on the port for policies to be active. You can add more than one policy on a port. If more than one policy applies, the last policy entered is used

A manual policy consists of an action, the packet types that require the action, and the source and destination addresses between which the action occurs.You must also use the SETDefault command with the ManualKeyInfo parameter.

The “mask” portion of the <scr_ipaddr/mask> and <dst_ipaddr/mask> parameters is only used for special configurations and is normally not included. The <src_ipaddr> parameter will normally be one of the router’s IP addresses. The <dst_ipaddr> parameter will normally be one of the peer system’s local IP addresses. Alternatively, DYNamic can be specified instead of <dst_ipaddr> when the destination IP address of the peer system is not known when the policy is configured. This would apply in cases where the peer system’s IP address is assigned dynamically using IPCP or DHCP.

It is recommended that IPSEC control or the PORT service control be disabled while configuring policies and enabled only after all IPSEC policy and key set configuration has been completed.

This command can be executed by users with network manager privileges only.

Values

policy_name	A name you assign to the policy you are adding. <policy_name> can be 1 to 15 characters long, but cannot be all or ALL.
src_ipaddr/mask, dst_ipaddr/mask | DYNamic	The source and destination addresses of the packets. You can specify either a single address or a range of addresses using a mask. You can specify DYNamic if you do not know the destination address, for example, if the system’s IP address is assigned dynamically using IPCP or DHCP.

The mask is a number in the range of 0-32, which indicates the number of bits in the IP address that remain unchanged for the IP addresses in that block. The remaining bits in the IP address should be all 0s. The address block includes all addresses except for the first address and the last (x.x.x.255) address.

For example:

144.195.0.0/16.
All addresses in the range from 144.195.0.1 to 144.195.255.254

144.195.1.2/32
The host itself 144.195.1.2

0.0.0.0/0
All the IP addresses in your network

224.0.0.0/4
All the class D multicast addresses, from 224.0.0.1 through 239.255.255.254

3DES2key
Specifies Three stage Cipher Block Chaining. 3DES2key must be at least 16 bytes long for x xS packages. The 3DES2key key is constructed using the first 8 bytes for both encrypt phases, and the second 8 bytes for the decrypt phase of the encrypt-decrypt-encrypt (
EDE) transform.

DES
Specifies Cipher Block Chaining mode of the Data Encryption Standard. DES keys must be at least 8 bytes long.

RC5
Specifies encryption used with Microsoft Point to Point Ecryption (MPPE). RC5 keys must be at least 5 bytes long, and may be up to 7 bytes with xE packages or up to 15 bytes with xS packages.

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RSVP SERVICE PARAMETERS

11.1 Release Notes, *Reference for NETBuilder Family Software*

Replace Chapter 60 with this chapter.

This chapter describes the Resource Reservation Protocol (RSVP) Service parameters. RSVP is used in multicasting applications like video conferencing, multimedia, and virtual private network (VPN) network management. RSVP permits host applications to request Quality of Service from the network.

Table 2 RSVP Service Parameters and Commands

Parameters	**Commands**
CONFiguration	SHow
CONFiguration	SETDefault, SHow
MaxFlowRate	SETDefault, SHow
REQuest	SHow
RESerVation	SHow
UDPEndcap	SETDefault, SHow

CONFiguration

Syntax

```
SHow  -RSVP  CONFiguration
```

Default None

Description The CONFiguration parameter displays all RSVP configuration information for a PPP/Frame Relay port. The amount of bandwidth configured for RSVP via the PORT Service parameter, PROTocolRsrv, is displayed.

CONTrol

Syntax

```
SETD  -RSVP  CONTrol = ENable |  DISable
SHow  -RSVP  CONTrol
```

Default `DISable`

Description The CONTrol parameter specifies whether the RSVP capability is enabled. If RSVP is disabled, all RSVP messages are forwarded as IP data packets.

MaxFlowRate

Syntax

```
SETD  !<port>  -RSVP  MaxFlowRate =  <bytes/sec>(0-562500)
SHow  [ !<port> | !* ]  -RSVP  MaxFlowRate
```

Default Amount of bandwidth reserved for RSVP.

Description The MaxFlowRate parameter specifies the maximum amount of bandwidth in bytes/sec that can be allocated to a single flow.

REQuest

Syntax

```
SHow  [ !<port> | !* ]  -RSVP  REQuest
```

Default `No default`

Description The REQuest parameter displays the outstanding RSVP reservation requests, that is a PATH was message sent but a corresponding RESV message has not been received, or a reservation request was denied at the local interface.

RESerVation

Syntax

```
SHow  [ !<port> | !* ]  RESerVation
```

Default `No Default`

Description The RESerVation parameter displays the current active reservations.

UDPEndcap

Syntax

```
SETD  !<port>  UDPEncap = ([Enable | Disable])< IP Multicast Address > |
Default
SHow  [ !<port> | !* ]  UDPMultiCast
```

Default Disabled. Only IP-encapsulated RSVP UDPEncap messages are sent unless UDP-only host presence is learned via the receipt of UDP-encapsulated RSVP messages.

Description The UDPEndcap parameter controls the UDP encapsulated RSVP messages. Normally, the NETBuilder bridge/router learns of a UDP host or hosts present at an interface by listening for UDP-encapsulated Path messages that were sent to either the well-known multicast address, 224.0.0.14, or to the address of the interface itself. However, if no UDP-encapsulated path message is received at the interface, the UDPEndcap parameter must be explicitly configured on the interface for the NETBuilder bridge/router to send UDP-encapsulated RSVP messages to a UDP host that is connected at the interface.

If the UDPEndcap parameter is enabled, RSVP messages are sent UDP-encapsulated as well as in raw IP mode at the specified interface. If the UDPEndcap parameter is disabled, RSVP messages are sent in raw IP format only.

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SR SERVICE PARAMETERS

11.1 Release Notes, *Reference for NETBuilder Family Software*

Place this page in front of Chapter 69.

AllRoutes

Syntax

```
FLush [!<port> | !*] -SR AllRoutes [Dec | Hex] [<Transparent | Null | route
 segment>] [Discover | Static]
SHow [!<port> | !*] -SR AllRoutes [Dec | Hex] [<Transparent | Null | route
 segment>] [Discover | Static] [<count>]
SHowDefault [!<port> | !*] -SR AllRoutes [Dec | Hex]
```

Default All routes in the routing table in decimal format

Description The AllRoutes parameter allows routes in the routing table to be flushed or displayed in decimal or hexadecimal format. The SHowDefault command displays static routes defined by the ADD -SR ROUte command. The SHow command displays static and discovered routes.

Dynamically learned routes used by LLC2 do not appear in the routing table. You cannot display, flush, or delete RIFs used by LLC2.

Values

Dec | Hex — Specifies whether decimal or hexadecimal format is used to enter and display routes. Decimal is the default format.

<Transparent | Null | route segment> — Limits the routes displayed or flushed to only Transparent routes, Null routes, or routes that contain the entered route segment.

A route segment is a series of alternating ring and bridge numbers:
:<ring number> & <bridge number>

The colon (:) precedes the ring number; the ampersand (&) precedes the bridge number. The following is an example of a route segment where the frame travels from ring 25 via bridge 2 to ring 4:

```
:25&2:4
```

Discover | Static — Discover specifies only dynamic routes learned through the route discovery process are flushed or displayed. Static specifies only manually configured routes using the ADD ROUte command are flushed or displayed.

<count> — Specifies the number of entries to be displayed.

ROUte

Syntax

```
ADD !<port> -SR ROUte <media address> [Override] [Dec | Hex] [ Transparent |
 {Null | <source route> [<largestframesize>]}]
DELete !<port> -SR ROUte <media address>
SHow [!<port> | !*] -SR ROUte [[Cmac | Ncmac] %<media address>] [Dec | Hex]
SHowDefault [!<port> | !*] -SR ROUte [[Cmac | Ncmac] %<media address>] [Dec
 |Hex]
```

Default No default

Description The ROUte parameter configures, deletes, and displays a static route for a remote end system.

Values

<media address> Specifies the media address of a remote station. Must be 12 hexadecimal digits and preceded by a percent sign (%).

Use the Cmac keyword when the media address is entered in canonical format and the Ncmac keyword when the media address is entered in noncanonical format.

If neither Cmac nor Ncmac is specified, the current setting of the -SYS MacAddrFormat parameter is used.

Override Specifies that the static route can be replaced by a learned route if the route has been determined to be inoperational.

Dec | Hex Specifies that the route information is entered or displayed in decimal (Dec keyword) or hexadecimal format (Hex keyword).

Transparent Specifies that no RIF be used on frames sent to the specified address; the target is on the local ring or reached via transparent bridges. The default is a transparent spanning tree route.

Null Specifies that a null RIF is used; the target is on the local ring.

<source route> Specifies a source as a sequence of rings and bridges in the order in which a source-routed packet traverses the source route bridged network. The route is specified as follows:

```
:<ring_number>&<bridge_number>[:<ring_number>]...
```

A ring number must be preceded by a colon (:), and a bridge number must be preceded by an ampersand (&). The following is an example of a route where the source route packet initiated at Ring 25 is forwarded through Bridge 2 onto Ring 4 before reaching its end system destination:

```
:25&2:4
```

A valid route must begin with a ring number that matches the ring number assigned to the specified port. If the last element specified in <route> is a bridge number, that element is ignored.

<largestframesize> Specifies the largest size MAC frame that can be transmitted to the indicated end system using this route. An integer value of 0 through 7 may be assigned. The default value is 3. The base values specified in IEEE 802.1D are supported; however, extended values are not currently supported. Enter one of the following numbers for the largest frame size value:

0 for 516 bytes
1 for 1,470 bytes
2 for 2,052 bytes
3 for 4,399 bytes
4 for 8,130 bytes (not supported)
5 for 11,407 bytes (not supported)
6 for 17,749 bytes (not supported)
7 for 41,600 bytes (not supported)

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SYS SERVICE PARAMETERS

11.1 Release Notes, *Reference for NETBuilder Family Software*

Place this page in front of Chapter 71.

CONFiguration

Syntax

```
SHow -SYS CONFiguration
```

Description The CONFiguration parameter displays various SYS Service parameter values. The display generated with this parameter is the same as the display generated by the SHow -SYS GLobalPARams command.

77 WEBLINK SERVICE PARAMETERS

11.1 Release Notes, *Reference for NETBuilder Family Software*

Place this page in front of Chapter 77.

StatPollInterval

Syntax

```
SETDefault -WEBLink StatPollInterval = <value> (0-120)
SHow -WEBLink StatPollInterval
```

Default 60 (minutes)

Description The StatPollInterval parameter specifies the time interval in minutes which represents one bar in a Web Link bar graph. When a value of zero (0) is specified for this parameter, statistic samples are not collected.